BULLETIN OF MISCELLANEOUS INFORMATION Appendix I, 1927. ROYAL BOTANIC GARDENS, KEW.

REVIEW OF THE WORK OF THE ROYAL BOTANIC GARDENS, KEW, DURING 1926.

Official Visits.

During the year the Director, as the official representative of H.M. Government, attended the Fourth International Congress on Colonial and Tropical Agriculture, which was held in Paris in March.

The Director also attended the International Congress of Plant Sciences held at Ithaca, New York State, U.S.A., from August 16th to the 23rd. On the conclusion of the Congress he visited the Missouri Botanical Garden, St. Louis, and the University of California, Berkeley, where he had been invited to deliver three lectures. The only previous visit of a Director of Kew to the Missouri Botanical Garden was that paid by Sir Joseph Hooker to Henry Shaw in 1877.

Thanks to the kindness of the Dean of the College of Agriculture at the University of California and to the Professors in the various Botanical Departments he was able to visit the Yosemite region, the transplant stations and experiments which are being conducted by Dr. H. M. Hall under the auspices of the Carnegie Institution, the Redwood forests at Scotia and Eureka, north of San Francisco, as well as the Golden Gate Park, San Francisco, and Leland Stanford University, where it is hoped to develop a Botanic Garden worthy of this interesting region. On his way to Berkeley the city of Los Angeles was visited, and a lecture was delivered by invitation on the value and functions of a Botanic Garden, in connection with a scheme in project there for the formation of a Pacific Botanic Garden in the Mandeville Canyon, a scheme which it is learnt has now materialised.

He then proceeded to Seattle and ascended Mt. Rainier to the limits of vegetation and journeyed thence to Victoria, where he was the guest of the Lieut.-Governor and was invited to deliver a lecture on the importance of Botanic Gardens and on the urgent need of reserving a large and beautiful woodland area for the preservation of the magnificent native vegetation. He was also able to impress on the Mayor and leading authorities in Victoria the benefit that should result in the formation of the proposed botanic garden in their Park to illustrate the native flora.

A visit was paid to the University of British Columbia at Vancouver, where the Director lectured to a large audience. Here

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he was pleased to find a small and very interesting botanic garden in course of development.

Both in Victoria and Vancouver and also at Banff he was greatly impressed by the keen interest displayed in the rich flora of British Columbia and Western Canada and by the foundations which exist for the compilation of a Flora of this wonderful region.

A brief visit was paid to the University of Toronto, under the guidance of Professor Thomson, and here again the absence of a botanic garden was felt to be a matter demanding the attention of the Canadian authorities.

The Director was given the opportunity of laying this important matter before the President of the University, and it is much to be hoped that a garden worthy of the Dominion may before long be established in this very suitable central position.

From Toronto the Director journeyed to Washington, D.C., to visit the U.S. Department of Agriculture and the herbarium of the Smithsonian Institution, and he was enabled, through the great kindness of Dr. Taylor, Dr. Marlitt, Dr. Fairchild, and other officials of the Department, to study fully the quarantine regulations and all the arrangements concerned with plant introductions and the details of the special plant introduction glass houses.

The lecture which had to be given at Washington was, he felt, but a small return for all the kindness and courtesy he received at the hands of the officials of the Department and of the Smithsonian Institution.

He then travelled to New York to deliver the lecture which he had been invited to give by the Director-in-Chief of the New York Botanical Garden, and he had the honour of being introduced to his audience by the Director-in-Chief himself. During his stay he paid visits to the Boyce Thompson Institute at Yonkers, and to the Brooklyn Botanical Garden, where he was duly impressed by the educational uses to which this interesting Garden is being put.

At New York after his lecture he was entertained at dinner by Dr. N. L. Britton and some 43 other botanists, representing Columbia University, the Boyce Thompson Institute, Brooklyn Botanical Garden, Yale University, Cornell University, Princeton University, Rutgers University, Pennsylvania State College, the Bureau of Plant Industry and The New York Botanical Garden, were present. Dr. Britton read the following address of welcome.

"We gladly welcome the occasion of a visit by the Director of the Royal Botanic Gardens at Kew, as opportunity to express to him our cordial appreciation of the great contributions to knowledge which have characterised that wonderful institution throughout its history. These have aided and stimulated botanical investigation in all lands, and nowhere more than in these United States, portions of which Dr. Hill has been traversing during the past few weeks. He and his distinguished predecessors have had the guidance and direction of the activities of Kew over a period of 86 years, the institution dating as a public botanical

garden from about the year 1840, its site, however, occupied by royal gardens for a century preceding.

"My first visit to Kew was in 1880, in the course of a trip to Europe soon after graduation; this was during the administration of Sir Joseph Hooker. My first studies there were in 1888, on which occasion I spent much time in determining Bolivian specimens collected by Dr. Rusby; Sir William Thiselton-Dyer was Director at that time. It was on this visit that the inspiration for the establishment of a botanical garden in New York was obtained by Mrs. Britton, which bore fruit a few years subsequently through a committee of the Torrey Botanical Club. We were at Kew again in 1891, for supplementary inspiration, and for study of the Paraguay collection made by Dr. Morong. I was at Kew for a week after the Paris Botanical Congress in 1900; again in 1902, soon after our first West Indian explorations had been accomplished; again in 1905, after the Vienna Botanical Congress. In the summer of 1911 we were there for the study of Cuban and other West Indian plants; Sir David Prain had then been appointed Director. Our most recent visit to Kew was in 1920, especially for the study of Cacti, and of some of the large collections from northern South America, then commencing to be obtained; the institution was still under the directorship of Sir David Prain, but Doctor Arthur W. Hill was Assistant Director, since promoted.

"We have known all through these years that at any time we might be privileged to be at Kew we would be taken into the family and made to feel essentially like members of the staff; our visits have been profitable and delightful. May I express to Dr. Hill our profound conviction that under his administration the laurels of his great institution will become more and more luxuriant."

Prof. J. M. Coulter, Dr. H. H. Rusby, Prof. R. A. Harper, Dr. G. Stuart Gager and Dr. H. Crocker made equally kind speeches expressing their admiration of Kew and their indebtedness to the Institution, and the Director did his best to return suitable thanks for all the kind things which had been said, which he fully realised were intended to apply to all the officials at Kew whom he, at the moment, represented.

The final visit in the United States was to Boston, and there the Director spent one day at the Gray Herbarium and another all too short day at the Arnold Arboretum with Professor C. S. Sargent; and at both institutions, thanks to Prof. B. L. Robinson and his staff and to the Director and other officials at the Arboretum, he was enabled to derive the fullest possible profit and interest during his stay.

He finally travelled to Montreal to visit McGill University, where he delivered a lecture at the invitation of the Professor of Physics, and also visited the Botanical Department, under the guidance of Professor Lloyd, and the interesting private garden of Mr. Cleveland Morgan.

From Montreal he travelled home in the C.P.R. S.S. "Melita," and reached Kew on October 14th.

Mr. W. Taylor, Assistant Curator, Tropical Department, in September visited the chief gardens of the French and Italian Riviera, including those of H.H. The Prince of Monaco and Mr. Cecil Hanbury at La Mortola.

Mr. A. Osborn, Assistant Curator, Arboretum Department, during July visited the Royal Botanic Garden, Edinburgh, and the new Bayley Balfour Memorial Garden at Ben More.

The Gardens.

The number of visitors to the Gardens in 1926 was 1,162,547. This was a decrease of 509,293 on the figures for the preceding year. Although the charge of one penny for admission, which was removed in 1924, was reimposed as from the 1st January, 1926, the attendance for the first four months exceeded by over 21,000 that for the corresponding period of 1925 when admission fees were charged on Students' Days only. The decline was greatest in May and June, when travelling facilities were restricted owing to industrial troubles. It is during these months that the largest number of visitors normally attend the Gardens. In June, 1925, 332,458 visitors were recorded against 144,174 during June, 1926. In May also unusually inclement weather was experienced, and this also adversely affected the attendance of visitors.

Plant Houses.—The Conservatory (No. 4) and Nepenthes House have been repainted, and the woodwork of the Victoria House (No. 10) has needed extensive repair owing to decay. Through defects in glazing the roof of the Temperate House has for some years past leaked badly, the drip causing damage and unsightliness to the plants in the beds beneath. A commencement was made during the summer at the south end in its thorough overhauling. The corrugated brick pavement has been completed in the Aroid House (No. 1), the Cape House (No. 7), and the Water Lily House (No. 15), and it has also been laid down in the cool Fernery House (No. 3).

New Rhododendron House.—Owing to considerable delay in completing this house (see *K.B.* 1926, App. I., p. 1), the stocking of it with plants had to be deferred until last autumn. The greater proportion of the plants used have been raised and grown at Kew, but several correspondents have contributed valuable species, notably Mr. J. C. Williams and Mr. Lionel de Rothschild. To the former especially Kew is indebted for a large number of fine specimens sent from his magnificent collection at Caerhays. As stated in the previous issue, it is intended to use this house for the more tender Chinese species. The soil with which the beds have been filled is "top-spit" taken from the Queen's Cottage

Grounds at Kew. This we find is a much better medium for cultivating rhododendrons under glass than a peaty soil, which, through lack of aeration and constant watering, is very apt to turn close and sour in a few years' time. The Kew soil, although lacking richness, is free from lime and keeps sweet for a much longer time.

Rose Garden.—The garden varieties of roses in the new arrangement of beds west of the Palm House were very difficult to keep clean and free from aphides in the early part of the season, and their first crop of flowers was somewhat affected thereby. In August, however, the second growths provided a very fine display, and attracted the interest of a great number of visitors. We have to thank several trade establishments for their interest in this garden, and for the presentation of new varieties to be planted there, especially Messrs. Dobbie, Messrs. Beckwith, Messrs. Barbier, of Orleans and Mr. Easlea.

Collections of Rosaceae and Saxifragaceae.—The rearrangement of these collections in the Arboretum, adverted to in the last Review (p. 5), has been continued during the autumn and winter. The shrubs belonging to the *Saxifragaceae*—the chief genera being *Philadelphus*, *Deutzia* and *Ribes*—are now established west of the Holly Walk. The collection of wild species of *Rosa* is opposite to them on the eastern side. Interest in the wild types of roses has been growing in recent years, and students will be able to inspect them with more comfort in their new quarters. Here most of them will be grown as isolated plants or in isolated groups of three, so that their examination will not entail such risks to clothing as it did when they were crowded in the border which has so long been their home. Owing to the dominant place the garden types of rose occupy in horticulture, the beauty of these wild types is apt to be overlooked and disparaging comparisons made. Judged on their own merits, many of them are singularly attractive, and although their season of flowering is short compared with that of the Tea Rose and Hybrid Perpetual sections, many of them have a beauty in fruit to which the latter can lay no claim. It is anticipated that the collection at Kew, with the greater space now provided for their individual development, will be able to display their attractions much more effectively.

The movement of large collections of shrubs like these involves very much labour, as the borders occupied by the roses have had to be filled with Spiraeas and the place of these again filled with Cotoneasters.

Riverside Avenue.—The view of the docks and railway across the Thames at Brentford was always a distressing eyesore from the Gardens during the winter as long as the belt of vegetation forming the screen between the Riverside Avenue and the ha-ha was of a deciduous nature. During the years 1912 and 1913 a large number of elms and other hungry trees were felled and their place taken by large evergreens. These have grown very well indeed, and besides adding greatly to the interest of this part of the garden now constitute

an admirable screen effective throughout the year. Owing to the extension by the Great Western Railway of their works on the Middlesex side of the river right up to the Sion House property, it has become necessary to carry on the screen of evergreen vegetation still farther. This necessitated the felling of several elm trees and planting in their place a number of large specimens assembled from various parts of the Gardens. As long as the Sion House property remains in its present condition it is not likely that any further plantings of this kind will be necessary.

Decayed Trees.—As has been the case every year since the great drought of 1921, a number of beech trees have either died or become so decrepit that their removal became necessary. No tree of great botanical or historical interest has been lost, although a large limb was wrenched from the fine Maidenhair tree (*Ginkgo biloba*), near No. 2 Fernery, by a fierce gust of wind during the summer. The picturesque old horse chestnut close to the Isleworth Gate entrance to the Queen's Cottage Grounds has died after being in failing health for some years. A large common elm, too, growing on the western slope of the Rhododendron Dell was taken down as no longer safe.

Service Road.—This road starts at the depot near Kew Palace, and after passing through the Stable Yard, extends to the Queen's Gate on the Kew Road. It has always been difficult to keep in good repair owing to its narrowness, to the weight of the fuel vans, etc., that pass along it, and to the fact that in places it is heavily shaded by trees which keep the surface damp and soft. H.M. Office of Works have undertaken the re-making of it by laying down a foundation of road metal solidified by a steam roller and surfacing this with tarmac. That portion extending from the Kew Palace Depot to the Stable Yard has now been finished, and it is hoped that the remainder will be treated similarly in 1927.

Items of Special Interest.—Special exhibitions were arranged throughout the year in House 14c, which was set aside in 1926 for Objects of Special Interest. In addition to the subjects mentioned in the last Review the following were shown :—the development of the modern varieties of *Schizanthus*; the history of *Primula kewensis*; a collection of oranges, lemons and gourds from the garden of Mr. Cecil Hanbury at La Mortola; new and rare plants in flower.

Considerable interest has been aroused recently in the plants yielding Chaulmoogra Oil (*K.B.* 1926, p. 17). Through the courtesy of correspondents in India and the East, several consignments of seeds have been received at Kew, and about 120 seedlings of species of *Hydnocarpus* have now been raised. These will be distributed to various botanic stations in the Empire during the coming summer.

The most interesting plant that flowered at Kew during the year was *Amorphophallus Titanum*, which opened its enormous spathe on August 4th. An illustrated article giving rates of growth and other particulars appeared in the *Kew Bulletin* 1926, p. 374.

Another plant of unusual interest that flowered during 1926 was a hybrid between *Amaryllis belladonna* and *Crinum Moorei*. This plant was raised by Mr. F. Howard, California, and presented by him to Kew through Mr. T. Hay, Superintendent of Hyde Park, in November, 1924. Mr. Howard has recently been awarded the Cory Cup for this hybrid under the name of *Crindonna Memoria-Corsii* as the best new hardy plant of 1926. Plants from a similar cross were raised in Europe previously (see Gardeners' Chronicle, January 15th, 1921, p. 32). The plant at Kew is grown in a narrow border at the foot of a south wall.

His Majesty the King presented from the Frogmore Gardens several fine palms, which have been suitably labelled and planted in the Temperate House and the Palm House, also some Crotons, and plants of *Cupressus lusitanica* var. *Benthamii*.

In March, and shortly before his death, the late Mr. J. A. Kenrick, of Edgbaston, presented to Kew 850 bulbs (his entire collection) of Hippeastrums, a class of plants he had cultivated for many years and of which he had raised many varieties. So large an accretion to the number of plants we already possessed compelled us, from considerations of space, to overhaul the whole stock and eliminate a number of duplicate forms. These were distributed to Sydney Botanic Gardens, H.H. The Begum of Bhopal, Trinidad Botanic Garden, the National Botanic Garden at Kirstenbosch, S.A., and the Department of Agriculture, Pretoria.

Vanda Lowii.—A very fine specimen of this Orchid, probably the finest in Britain, was presented to Kew in September by Mr. W. H. B. Fletcher, Aldwick Manor, Bognor. It measures ten feet in length, and being fetched in a light motor van, arrived in perfect condition, with nearly a score of its long pendent flower racemes still attached and uninjured. It is planted in the warm section of the Orchid House.

Nothofagus obliqua.—Considerable interest has been aroused in this Chilean beech as represented at Kew among those interested in economic forestry. The oldest specimens are growing near the Stable Yard and in the collection of beeches near the Azaleas. They were raised from seed given to Kew in March, 1902, by the late Mr. H. J. Elwes which had been collected by him in Chile. The largest of these is now 68 feet high, its trunk 3 feet 3 inches in girth. Apart from poplars and willows there must be very few hardwood trees capable of so quick a growth in a climate like that of Kew, especially considering the poverty of the soil in which they are growing. Another point in their favour is that they usually form slender trees with only comparatively small side branches, thereby approaching the forester's ideal tree even in the open ground. Mr. Elwes describes the timber as "dense, reddish, not at all resembling that of the European beech and apparently suitable to take the place of lower grades of mahogany in the manufacture of furniture. It cracks, however, badly in drying, and will require very careful seasoning." On the whole it would

seem that this beech is worth a trial under forest conditions in this country. As Mr. Elwes delivered his seeds at Kew in the month of March, it would appear that they ripen naturally in February. Many seeds sent to this country have failed through being kept dry too long. The most important factor in their successful introduction is that the shortest possible period should elapse between gathering them in Chile and sowing them in this country.

By desire of the Right Hon. S. M. Bruce, Prime Minister of the Australian Commonwealth, a number of trees were despatched by the s.s. "Balranald" to the Sydney Botanic Garden a few days before Christmas. They consisted of 8 beeches, 8 oaks, 8 horse chestnuts, 6 alders, 6 elms, and 6 Cricket Bat willows, all of which had been raised at Kew. If they arrive in Australia in a suitable condition they are intended to be planted at Canberra by the Duke and Duchess of York and other notable personages on the occasion of the opening of the new Parliament Buildings there. The introduction of trees from this country to Australia has always been attended with difficulty owing to the opposition of the seasons and the passage through the tropics, but every step possible has been taken to ensure their safe arrival. They were packed in a ventilated box with their roots embedded in damp moss and arrangements were made with the officers of the "Balranald" to place them in cool storage. It is expected that during the voyage they will not be subjected to a temperature higher than 40 deg. Fahr. which should enable them to pass through the tropics without being excited into growth. Kew has had close and continuous relations with Australia since the days of Sir Joseph Banks and Captain Cook. Some of the earliest plant collectors from Kew went there, amongst them Peter Good, George Caley and Allan Cunningham, and Kew has always possessed a collection of Australian plants unequalled anywhere except in Australia itself.

Publications.—Eight further sets of picture postcards of plants in natural colours have been placed on sale during the year, at the Publication Kiosk near Museum III. The subjects are Hardy Trees and Shrubs (two sets), Stove and Greenhouse Plants (two sets), Rhododendrons, Roses, Orchids and Decorative Plants. Each set consists of six cards with a descriptive folder, and is priced at one shilling; individual cards may be purchased at 2d. each. A complete list of the postcards on sale may be obtained on application.

Additions to Gardens, 1926.—The number of separate consignments of living plants, seeds, etc., was 789, a decrease of 31 on those of 1925. The most important contributions were the following :—

Public Institutions:—

Aberdeen, Botanic Gardens.—Plants of *Didymocarpus bicolor*, *D. insula* and *D. tristis*.

Cambridge, Botanic Garden.—Plants of *Bomarea cantabrigiensis* and *Alstroemeria pulchella*.

Edinburgh, Royal Botanic Garden.—90 packets of seeds, and plants of *Primula heterochroma*, *Rhododendron* spp., etc.

Glasnevin, Botanic Garden.—Hardy plants and 65 packets of seeds.

Hyde Park (per Mr. T. Hay).—Bulbs of *Crindonna Memoria-Corsii*, seeds including *Lathyrus magellanicus*, *Lilium* spp., *Fremontia mexicana*, etc., and miscellaneous greenhouse and herbaceous plants.

Windsor, The Royal Gardens.—Specimen Palms, *Cupressus lusitanica* var. *Benthamii* and small Crotons.

Adelaide, Botanic Gardens, Australia.—Seeds of *Eucalyptus* spp.

Arnold Arboretum, Jamaica Plain, Mass., U.S.A.—381 packets of seeds, grafts of *Quercus* spp., and plants including *Decodon verticillatum*, and *Viburnum* spp.

Bermuda (Paget East), Department of Agriculture.—Bulbs of *Lilium longiflorum* var. *Harrisii*.

Bucharest, Botanic Garden, Roumania.—41 packets of seeds.

Buitenzorg, Botanic Garden, Java.—118 packets of seeds and fern spores.

Calcutta, Royal Botanic Garden, India.—Seeds of *Hydnocarpus Wightiana*.

Chinese Eastern Railway Co.'s Experimental Station, Manchuria.—Seeds of Chinese plants.

Darjeeling, Lloyd Botanic Garden, India.—390 packets of seeds.

Dehra Dun, Forest Research Institute, India.—Miscellaneous seeds, including *Adina cordifolia* and *Bassia longifolia*.

Dunedin, Botanic Gardens, New Zealand.—69 packets of seeds and a collection of filmy ferns.

Gambia, Department of Agriculture.—Tubers of ground orchids, including *Lissochilus purpuratus*.

Hongkong, Botanic and Forestry Department.—Seeds, including *Lilium Brownii*.

Honolulu, Department of Agriculture and Forestry, Hawaii.—Seeds of *Argyroxiphium sandwicense*.

Kirstenbosch, National Botanic Garden, Cape Town, S.A.—51 packets of seeds and plants of *Pelargonium capitatum*, *Watsonia* spp. and *Lachenalia* spp.

Leningrad, Botanic Garden, Russia.—64 packets of seeds.

Missouri, Botanic Garden, U.S.A.—Plants of *Dionaea muscipula*, and seeds of *Nelumbium luteum*.

Morton Arboretum, Lisle, Illinois, U.S.A.—50 packets of seeds.

New York, Botanical Garden, U.S.A.—Stove plants and seeds of *Lilium* spp.

Palermo, Botanic Gardens, Italy.—117 packets of seeds.

Paris, Botanic Gardens, France.—Plants of *Kalanchoe* spp., etc.

Peradeniya, Royal Botanic Garden, Ceylon.—Collection of stove plants and seeds of *Areca concinna*, *Arenga Wightii*, etc.

Philadelphia Academy of Sciences, U.S.A.—Seeds, including many species of *Calceolaria*.

Sapporo, Botanic Garden, Japan.—44 packets of seeds.

Sierra Leone, Dept. of Lands and Forests, West Africa.—Seeds of *Dioncophyllum Dawei*.

Singapore, Botanic Garden, Straits Settlements.—Collections of Stove plants including *Nepenthes* spp., *Aeschynanthus* spp., and seeds of *Nipa fruticans*, *Sagus laevis*, etc.

Sydney, Botanic Gardens, Australia.—Seeds of Australian plants including *Macrozamia mountperiensis*, *M. spiralis*, etc.

Trinidad, Royal Botanic Garden.—Plants of *Anemopaegma grandiflora* and *A. carrerense*.

Washington, U.S. Department of Agriculture.—Plants including *Cydonia oblonga*, *Castanea mollissima*, *Rhamnus globosa*, etc.

Private Donors:—

Mr. B. C. Aston, Wellington, New Zealand.—46 packets seeds of New Zealand plants.

Rt. Hon. the Earl Bathurst, Cirencester.—Seeds and plants of *Picea purpurea*.

Mr. W. E. Broadway, Port-of-Spain, Trinidad.—Collections of orchids and fern spores.

Mr. N. E. Brown, Kew.—Seeds, plants and cuttings of South African succulents.

Sir Charles Cave, Sidmouth.—Plants and seeds, including *Quercus lamellosa*.

Dr. J. B. Christopherson, London.—Seeds of *Hydnocarpus venenata* and *H. anthelmintica*.

Col. Stephenson Clarke, Cuckfield, Sussex.—Plants including *Rhododendron indicum*, and conifers.

Dr. L. Cockayne, Wellington, New Zealand.—Seeds including *Clematis marata*.

Mr. W. P. Cranfield, Enfield Chase, Middlesex.—A large and representative collection of hardy ferns, including *Aspidium angulare* vars., *Scolopendrium vulgare* vars., etc.

Prof. L. A. Dode, Paris.—Seeds and grafts, including *Fagus multinervis*.

Mr. S. A. Duruz, Wallington.—Bulbs and seeds of a variety of *Lilium bulbiferum*, and alpines collected in the Lower Engadine.

Mr. Charles Eley, East Bergholt.—Plant of *Rhododendron Roylei* x *R. Maddeni*.

Mr. W. P. Ellmore, Leicester.—55 varieties of Basket Willows.

Major R. Emmett, Moreton Morrell.—Plants including *Daphne acutiloba*, *Berchemia lineata*, *Potentilla Beesii*, *Exochorda serratifolia*.

Mr. W. H. B. Fletcher, Aldwick Manor, Bognor.—Specimen plant of *Vanda Lowii*.

Mr. G. B. Foote, Elston, Puwakpitiya, Ceylon.—Plants of *Vanda Roxburghii*, *Vanda spathulata*, etc.

Hon. Vicary Gibbs, Aldenham House, Elstree.—Collections of hardy trees and shrubs.

Prof. H. H. Greenish, Pharmaceutical Society of London.—Bulbs of *Urginea Burkei* and plants of *Artemisia Cina*.

Mr. A. Grove, London.—Bulbs and seeds of *Lilium* spp.

Miss M. S. Hall, Woking.—Plants of *Platycerium alcicorne*, and small collection of succulents.

Mr. Cecil Hanbury, La Mortola, Ventimiglia, Italy.—68 packets of seeds, bulbs of *Iris tingitana*, etc.

Marquis of Headfort, Kells, Co. Meath, Ireland.—Rhododendrons.

Prof. A. Henry, Dublin.—Seeds and plants including *Glyptostrobus heterophyllus*, *Taxodium* spp., etc.

Mr. T. E. Henwood, Reading.—Collection of varieties of *Polypodium vulgare*.

Miss Agnes Hill, Groendoorn, S.W. Africa.—Collections of succulents including plants of *Mesembryanthemum concinnum*, *M. fulviceps*, etc.

Mr. G. Lindley Hinde, Assam.—Collection of orchids including *Vanda* spp., *Dendrobium* spp., etc.

Mr. F. N. Howes, Gold Coast.—Seeds including *Entada abyssinica*, *Pachyrhizus palmatilobus*, *Sarcocephalus esculentus*, etc.

Capt. C. Ingram, Benenden, Kent.—Plants and seeds of *Prunus* spp. and Japanese alpines.

Mrs. W. Jones, Hurlingham.—Plants of *Meconopsis Florindae* and *M. Wallichii* var. *alba*.

Mr. J. A. Kenrick, Edgbaston.—A collection of 850 Hippeastrums in variety.

Dr. A. F. G. Kerr, Bangkok, Siam.—Plants of *Dendrobium Friedricksianum*, fern spores and seeds including *Hydnocarpus ilicifolia* and *H. anthelmintica*.

Mr. C. C. Lacaita, Petworth.—Plants of twenty-two species of *Pulmonaria*.

Mr. C. H. Lankester, Costa Rica.—Seeds and plants including *Oncidium ampliatum* var. *majus*, *Laelia rubescens*, etc.

Sir William Lawrence, Bt., Dorking.—*Calceolaria pratensis* and greenhouse plants.

Mr. C. J. Leyland, Beal, Northumberland.—Plants and cuttings of *Cupressus Leylandii*.

Mr. G. W. E. Loder, Wakehurst Place, Ardingly.—Collection of Rhododendrons and conifers.

Mr. H. Armytage Moore, Co. Down, Ireland.—Collection of Rhododendrons including *R. Wardii*, *R. Maddeni* and *R. Baileyi*.

Mr. H. Musk, Wye, Kent.—Hardy British orchids.

Mrs. N. D. Parry, Assam.—Seeds collected in the Lushai Hills including *Boea hygrometrica*.

Sir John Ramsden, Bt., Gerrard's Cross.—Seedling Rhododendrons, corms of *Gladiolus Quartinianus*, etc.

Mrs. Rey, Hyde Park, London, W.—30 packets of seeds collected in Abyssinia.

Mr. George H. Rock, Kingston, Jamaica.—Specimen plants of *Broughtonia sanguinea*.

Mr. Lionel de Rothschild, London.—Seeds collected in South America, Rhododendrons and Chinese plants.

The Hon. Mrs. Ryder, Brockenhurst.—Collection of seedling *Gladiolus* spp.

Prof. C. E. Salmon, Reigate.—Plants including *Artemisia granatensis*, *Myosotis* sp. nov.

Mr. T. Sharp, Westbury, Wilts.—Cape succulents and *Encephalartos transvenosus*.

Major A. A. Dorien-Smith, Isles of Scilly.—Plants and cuttings including *Puya chilensis*.

Mr. F. P. Smith, Southgate.—A collection of *Sempervivum* spp.

Mr. Gilliat-Smith, North Persia.—50 packets of seeds.

Mr. W. H. Stansfield, Southport.—Hardy ferns including *Asplenium fontanum* and *A. septentrionale*.

Major F. C. Stern, Goring-by-Sea.—*Calceolaria Germainii* and seeds.

Mr. T. P. Stokoe, Cape Town, South Africa.—Seeds of *Erica* spp.

Mr. S. Tapscott, Kimberley, South Africa.—Seeds of *Stapelia* spp., and other succulents.

Mr. C. A. Treadwell, Wellington, New Zealand.—Seeds including *Sophora tetraptera*, *S. Treadwellii* and *Arthropodium cirrhatum*.

Mr. W. B. Turrill, Kew.—*Sempervivum* spp. and miscellaneous seeds collected in the Balkans.

Sir Oscar Warburg, Epsom.—Plants and cuttings of *Cistus* spp. *Helianthemum* spp. and *Salix* spp.

Mrs. Whittall, Haslemere.—Plants of *Nothofagus betuloides*.

Mr. J. C. Williams, Caerhays Castle, Cornwall.—223 packets of seeds collected by Mr. G. Forrest. Plants of *Styrax Hookeri*, Rhododendrons, *Prunus serrula*, etc.

Mr. A. Worsley, Isleworth.—Bulbs of *Brunsdonna Parkeri* var. *alba*.

Seeds and Plants received at Kew from America through agency of the Director, 1926.

Dr. A. W. Hill.—90 packets of seeds collected in U.S. and Canada, and seedlings of *Epigaea repens*.

Arnold Arboretum.—Plants of *Juniperus formosana*, *J. squamata* var. *Wilsoni*, *J. virginiana* var. *Burkei*, *J. chinensis* var. *dentata*, *Taiwania cryptomerioides*, *Abies balsamea* var. *macrocarpa*, *Picea brevifolia* var. *argentea*.

Dr. M. L. Fernald, Gray Herbarium, Cambridge, Mass.—48 packets of seeds collected in Newfoundland. 34 packets of seeds collected at Cape Cod.

Missouri, Botanic Gardens, St. Louis.—Night-blooming Nymphaeas, seeds of *Helianthus hirsutus*, *H. angustifolius* and *Nelumbium luteum*.

Miss A. Eastwood, Golden Gate Park, San Francisco.—Seeds of *Galvesia* (*Pentstemon*) *speciosa*.
New York, Botanical Garden.—Succulents, Stove plants and *Rhododendron Chapmani*.
Smithsonian Institute, Washington.—Collection of succulents.
Wyoming University.—Seeds of *Pentstemon* spp.
Mr. W. G. Corbitt, Pacific Lumber Co., Scotia, California.—Seeds of *Rhamnus Purshiana* var. *tomentella*.
Mrs. Rogers, Vancouver.—Seeds of *Thalictrum dipterocarpum*.
Dr. F. T. M. Lean, State College, Kingston, R.I.—Corms of hybrid Gladioli.

Distribution of Plants and Seeds.—The usual distribution of surplus plants from the various collections was made, either as gifts to educational institutions or in exchange with botanic gardens, nurserymen, etc. The total number of packets of seeds distributed was 10,058:—hardy trees and shrubs, 3428, hardy herbaceous plants, 6630; a net increase of 2831 packets compared with the 1925 distribution. The most important seeds specially distributed were *Nipa fruticans*, *Khaya ivorensis*, *Sclerocarya Schweinfurthiana*, *Olearia insignis*, *Calceolaria Darwinii*, *Phormium tenax*, *Rosa Hugonis*, *Quercus macedonica*, *Thalictrum dipterocarpum* and *Rhamnus Purshiana* var. *tomentella*.

Wardian cases of plants were despatched to the Botanic Gardens of Dominica, Singapore and Sydney. Other Wardian cases were sent to the Departments of Agriculture at Bathurst (Gambia) and Trinidad, as well as to the Siamese Minister at Bangkok, Siam.

The recipients of plants, etc., from Kew included the following:—

Cambridge, Botanic Garden.—Plants including *Carludovica rotundifolia*, *Dionaea muscipula*, *Utricularia prehensilis*, etc.
Edinburgh, Royal Botanic Garden.—Hardy trees and shrubs, greenhouse, stove and herbaceous plants.
Glasnevin, Botanic Garden.—Plants of *Taxus baccata* var. *nana* and alpines.
Singapore, Botanic Garden.—Plants of *Lecythis* spp.
Mr. F. R. S. Balfour, Dawyck, Stobo.—Plants of *Magnolia Wilsonii*.
Her Highness the Begum of Bhopal, India.—*Clivia miniata* and garden varieties of *Hippeastrum*.
Revd. C. R. Curtis, Magdalen College, Oxford.—Collection of Nymphaeas.
Lady Chaplin, South Africa.—Cuttings of *Populus* spp., bulbs of *Nerine* spp., and seeds of trees and shrubs.
H.R.H. The Duke of Connaught, Bagshot Park.—*Populus trichocarpa*.
Major R. Emmett, Moreton Morrell.—Plants of *Vitis megalophylla*, *Magnolia Wilsonii*, etc.

The Hon. Vicary Gibbs, Aldenham House, Elstree.—Trees, shrubs and herbaceous plants.

Dame Alice Godman, Horsham.—Plants and seeds of hardy trees, shrubs and alpines.

Mr. C. Hanbury, La Mortola, Ventimiglia, Italy.—Collection of succulents.

Mr. S. H. C. Hawtrey, Como, Thika, Kenya.—Plants of *Acrocomia sclerocarpa*.

Marquess of Headfort, Kells, Co. Meath, Ireland.—Hardy trees and shrubs, including *Nothofagus betuloides*, *Rhododendron strigillosum*, etc.

Mr. G. Lindley Hinde, Assam.—A collection of orchids, including *Cypripedium* spp., *Cattleya* spp., *Oncidium* spp., etc.

Capt. C. Ingram, Benenden.—Trees and shrubs.

Mr. C. H. Lankester, Costa Rica.—Collection of orchids and stove plants.

Sir William Lawrence, Bt., Dorking.—Greenhouse and decorative plants.

Mr. H. Lawson, Bermerside, Halifax.—Collection of economic plants.

Liverpool Corporation.—Grafts of 20 species of *Pyrus*.

Mr. T. Ashton Lofthouse, Middlesborough.—Herbaceous plants.

Mr. F. W. Millard, East Grinstead.—Alpines.

Major A. Pam, Broxbourne.—Hardy shrubs including *Pieris formosa*.

Mr. G. A. Rock, Jamaica.—Orchids including *Cattleya gigas* and *Laelio-Cattleya* hybrids.

Mr. Lionel de Rothschild, Exbury, Southampton.—Trees and shrubs including *Magnolia officinalis* and *Koelreuteria apiculata*.

Lady Beatrix Stanley, Market Harborough.—Alpines.

Sir Oscar Warburg, Epsom.—Trees and shrubs including *Rosa mirifica*, etc.

Mr. J. C. Williams, Caerhays Castle.—Plants of *Rhododendron Kingianum*, *Magnolia salicifolia* and *Prunus triloba*.

Mr. C. Woodward, Bewdley. Trees and shrubs.

Experimental Plantation in Richmond Park.—Among the several disadvantages Kew has to contend with in the cultivation of hardy plants is the one due to its low-lying situation. This renders the young growths of spring particularly subject to injury by late frosts in April and May, which, as is well known, are more frequent and more severe on low, flat levels than on adjacent elevated localities. It is, in consequence, practically impossible to grow out of doors at Kew certain trees and shrubs which, although subjected in their natural habitats to much greater winter cold than we ever experience here, are excited into early growth by what is to them unseasonable warmth. Last spring for instance the majority of the Chinese rhododendrons had their first growths entirely destroyed, thereby causing the formation of several weak

shoots in place of one strong one and making the development of flower buds during that season impossible.

Richmond Park is the nearest elevated ground to Kew and it appeared that it would be interesting and useful to compare the behaviour of plants grown there, more particularly as to hardiness, with those grown in the Gardens. Through the courtesy of H.M. Office of Works we have been permitted to use a plot of ground on one of the higher elevations. This as the crow flies is about two miles away from the Gardens. Its area is 100 feet by 30 feet, and it has been fenced round with wire netting to keep out rabbits and deer.

The following trees and shrubs were planted there on May 18th, 1926:—

Southern European.—*Coronilla valentina*, *Olea europaea* (Olive), *Cytisus filipes*, *Teucrium frutescens*.

Asiatic.—*Cocculus laurifolius*, *Cinnamomum brevifolium*, *Piptanthus nepalensis*.

South American.—*Myrtus Ugni*, *M. Luma*, *Crinodendron lanceolatum*, *C. dependens*, *Feijoa Sellowiana*, *Azara Gilliesii*, *Drimys Winteri*, *Calceolaria violacea*, *Eucryphia cordifolia*.

New Zealand.—*Leptospermum scoparium*, *L. scoparium* var. *Nichollsii*, *Hoheria populnea*, *Sophora tetraptera*, *Veronica Hulkeana*, *Griselinia lucida*, *Pittosporum Ralphii*, *Myrtus bullata*, *Acradenia Franklinae*, *Olearia nitida*, *O. Gunniana*, *O. erubescens*, *O. furfuracea*, *Corokia virgata*.

Chinese.—*Rhododendron aemulorum*, *R. basilicum*, *R. fictolacteum*, *R. megacalyx*, *R. pennivenium*, *R. crassum* series, *R. zeylanicum*, *Buddleia Farreri*.

With the valued assistance of the Meteorological Office and of H.M. Office of Works, we have been enabled to place some meteorological instruments in the Park near the plantation. The records from these instruments will, it is hoped, provide an interesting comparison with our own meteorological records at Kew, and with those of Kew Observatory. The Superintendent of the Observatory, Mr. F. J. W. Whipple, is very kindly supervising the instruments in the Park and assisting us in the comparison of the data obtained. So far as can be gathered from the short time during which the instruments have been in use, the daily maxima in the Park are in general slightly lower than at Kew, while the minima tend to be slightly higher. As regards humidity, the record of the hygrograph in the Park agrees very closely with that of the instrument at the Observatory, and no differences worthy of note have yet been observed.

National Pinetum at Bedgebury.—Owing to delay in preparatory work due to wet weather and shortage of labour, planting operations, postponed from the autumn of 1925, could not be undertaken until February, 1926. About 1,200 young trees were ready for planting and five workmen were sent from Kew

to do this. Unfortunately almost the whole of February was wet, and planting consequently had to be done under unsatisfactory conditions. The drains through years of neglect had ceased to function, and it was necessary to open many of them in order that the water from the ground to be planted might drain away. Even then, in some of the worst positions, mounds had to be made on which to plant the trees. However, most of the genera were dealt with, though some species of *Cupressus* had to be planted in temporary quarters, and most of the *Taxaceae* had to be left for another year owing to the position selected for them not having been prepared. Planting was a laborious operation, for the impassable condition of the roads made it necessary to unload the young trees at points varying from 200 yards to nearly half a mile from the points where they were to be planted, and they had to be carried there by hand.

Following a cold spring, when young shoots of early growing trees were crippled, there was a favourable growing season, and most of the young trees, even those planted in very wet places, became well established and made satisfactory growth. A few trees died and some were damaged by rabbits and pine weevils. The rabbits were got under control after the first fortnight, but weevils caused considerable damage to young pine trees during early summer and again in August and September. Some 7,000 weevils were trapped and it will be necessary to maintain a close watch over the trees again in 1927.

Two men and a boy have been employed in the Pinetum during the greater part of the year. There has been a good deal of work in keeping down weeds, suckers from Chestnut and Birch stools, bracken and rushes; for some weeks one person's time was almost fully occupied in trapping weevils. The opportunity of dry weather in summer was taken to clean out many of the drains and ditches, and this has resulted in the ground being much drier during the present winter than it was last year. The odds and ends of timber left on the ground after felling have mostly been cleared away and a number of wooden bridges have been laid across streams to connect important areas and facilitate work.

Permanent labels were placed upon some 300 trees planted during March, 1925, and it is hoped to replace the wooden labels on later planted trees by enamelled ones before long. A little planting was carried out in November, mostly the replacement of trees that had died, and further planting, chiefly of the Yew family, is contemplated during the coming spring.

From the general appearance of the trees planted in March, 1925, we confidently look forward to the Pinetum becoming a great success, for they have grown well and look very healthy. Some two or three had to be transplanted and the roots were found to be in excellent condition. The foundation of the Pinetum may now be considered as surely laid.

RAINFALL RECORDED AT THE ROYAL BOTANIC GARDENS, KEW, DURING 1926.

	Inches.		Inches.
January	2·47	July	2·06
February	2·47	August	0·99
March	0·16	September	1·30
April	2·94	October	2·08
May	1·99	November	5·11
June	3·03	December	0·36

Total 24·96 inches.

The Museums.

The retirement of Mr. John Masters Hillier after forty-seven years' service in the Museums, during the last twenty-five of which he was Keeper, took place on March 31st last, Mr. W. Dallimore succeeding to the position (*K.B.* 1926, p. 220). The change of Keepers necessitated some reorganisation of the Department and amongst changes already effected is that of the transference of Museum Headquarters from Museum I. to Museum IV. The want of more office accommodation in Museum I. had long been felt, but as more office space could only be acquired by correspondingly diminishing the area available for collections, it was decided to move the headquarters office to Museum IV. where three rooms on the first floor were available. This brings Museum Headquarters within easy reach of the Director's Office and effects an appreciable saving of time in intercommunication. The change, however, will not inconvenience visitors requiring information in Museum I., for an Assistant will still be stationed in the old office. As the officers responsible for fire control were dissatisfied with the use of open fires in Museum IV. the opportunity was taken of substituting radiators for open fires in the rooms that are now being used for the Museum Offices.

The drainage system and sanitary arrangements in Museum I. were very much out of date, and H.M. Office of Works have consequently thoroughly overhauled the system and fitted modern sanitary conveniences. The office in Museum I. has been fitted with electric light.

Temporary assistance to the Museum staff was provided for several months after the retirement of the late Keeper, until in November Mr. F. N. Howes, M.Sc., F.L.S., lately Economic Botanist of the Agricultural Department of the Gold Coast, was appointed to the vacant Assistantship in the Museums. This appointment will considerably strengthen the Department, for there will now be two Assistants with practical experience in the cultivation of tropical crops.

ROUTINE WORK.—Answers to correspondents have entailed replies to some 463 letters on miscellaneous economic subjects coming from all parts of the Empire, in addition to numerous reports.

A good deal of relabelling has been necessary amongst the collections, and there has been the usual indexing of information from periodicals. A considerable number of visitors have called at the Museums for special information, and 15 visitors have carried out private work for periods varying from a few days to several months.

Special Work.—A large number of specimens received at the close of the 1924-25 British Empire Exhibition have been incorporated in the collections. This entailed a good deal of work owing to the already congested state of the buildings. The difficulty of finding space for new exhibits in Museum III. was very pronounced. In this building space had to be found for fine collections of Canadian and Malayan timbers, in addition to an important collection of Japanese and Formosan woods that had been in store. In order to keep abreast with modern requirements and to display Empire woods to the best advantage, it is necessary to set up exhibits in commercial sizes. To exhibit large sections of timbers or planks in a satisfactory manner requires a good deal of space, and to obtain this certain inferior specimens had to be removed and a good deal of rearrangement undertaken. In addition it was necessary to remove a large number of historical prints and plans of 'Old Kew' from this Museum to Kew Palace (*K.B.* 1926, p. 369). There are still, however, many useful commercial timbers that cannot be displayed owing to lack of space.

The collections in Museum II. have been overhauled, some specimens have been discarded and others reduced in size in order to relieve congestion and make room for new and more up-to-date exhibits. The necessary rearrangements in both Museums II. and III. are practically completed and new Guides to the collections are in course of preparation.

The practice followed during recent years of making occasional special exhibits of important subjects has been continued. These have included exhibits of kitchen, dairy, and sports requisites from home-grown woods; Quinine, from the plantation to the finished drug, and models of hardy fruits with examples of the diseases common to fruit trees. Such exhibits have been found to be very popular with visitors.

Special investigations are in progress concerning important questions upon various economic plants, more particularly Cacao and Camphor. The efficacy tests of various insecticides on wood infested with wood-boring beetles commenced in 1922 were continued, and conclusions arrived at in 1925 as to the inefficacy of certain preparations were verified. Experiments have proved that the best time for the application of insecticides is in April. Unfortunately, in research of this character, definite results are only possible after a very lengthy experimental period, and the time available at Kew for such work is very limited. Part of this work has been carried out at the instance of H.M. Office of Works, and the results so far obtained have been appreciated by that Department.

Educational Visits.—Meetings of Scientific Societies have been attended and visits paid to centres of trade and imports that have a bearing upon the work of the establishment. In this connection an Assistant attended the Annual Meeting of the Museums Association at Bournemouth, and the Keeper attended and read a paper at the Annual Meeting of the British Association at Oxford. Visits have also been paid to the sale rooms and various other places for the inspection of the economic products derived from plants. The Port of London Authority have very kindly given facilities for periodic visits to the London Docks and Warehouses under their control, in order that methods of packing and the condition of products on arrival may be studied and new imports noted.

Presentation to Museums.—The following are the principal donations received during 1926 :—

Lady Harris, Hyde Park.—Herbarium specimens and Wood of three Brazilian trees.

Messrs. Bowyer & Bartleet, Fenchurch Street, London.—Sample of Morocco Roses.

Mr. I. H. Burkill, Kew.—Chinese Drugs and a collection of photographs of the Botanic Gardens, Singapore.

Prof. A. Henry, Dublin.—Wood of *Glyptostrobus pensilis*.

Mr. W. C. Edwards, London.—Sections taken from piles found 18 feet below the surface of the ground in Arthur Street West, London, which are said to have been driven by the Romans.

Mr. E. C. Horton, Westerham.—Planks of home-grown Timber.

Dr. C. C. Forsaith, Imperial Forestry Institute, Oxford.—Micro-photographs of Woods.

Department of Agriculture, Tanganyika.—Miscellaneous Agricultural Products.

Mrs. Bushnan, Kew.—Gum and Wood of *Agathis australis*, received from New Zealand.

Messrs. Cadbury, Bournville.—Cocoa and Cocoa Products in various stages of manufacture.

Department of Agriculture, Gambia.—Varieties of Ground-nut.

Sir W. T. Thiselton-Dyer, Witcombe.—Pictures showing *Phragmites*? on the shores of Lake Nyasa, and flowers at 8000 feet in the Cameroons; Map of Central Europe showing Hyrcinian Forest; Photograph of *Dyera costulata*.

Mr. Seacombe, Ealing.—Model of circular staircase.

Mr. C. F. Speh, New Orleans.—Photographs illustrating the Resin industry in the Southern United States, together with a specimen tapped log of *Pinus palustris*.

Messrs. Thomas Hill-Jones, Bow Common Lane, London.—Samples of Charcoal.

Mr. H. G. King, Peckham.—Twisted branch of Cedar.

Rev. A. C. Hutchinson, Japan.—Calcined Oranges picked up at the foot of the volcano, Sakurajima in South Japan after the great eruption in January, 1914.

Dr. Stapf, Kew.—Sample of *Ephedra distachya* from the Ukraine.

Mr. W. G. Nicholson, Basing Park, Hants.—Plank of *Cedrus atlantica*.

Major W. F. Chipp, South Malabar, India.—Box made of wood of *Polyalthia fragrans*.

The Director, Imperial Institute, South Kensington.—29 Miscellaneous Specimens.

Messrs. Landauer & Co., Eastcheap, London.—Two miniature bales of Manila Hemp.

Specimens have been distributed to the following individuals and institutions.—Mr. R. Kanehira, Formosa; Messrs. Cross & Bevan, London; Miss Edwina M. Beer, Bristol; Dr. C. C. Forsaith, Imperial Forestry Institute, Oxford; Mr. G. Burrell, Bournemouth; Secretary, Temple College, East Sheen; Mr. R. M. Harrison, South-Eastern Agricultural College, Wye; Mrs. L. M. Pape, London; Prof. Craib, University of Aberdeen; Prof. Borthwick, University of Aberdeen; Major Braid, West of Scotland Agricultural College, Glasgow; Prof. H. Pabisch, Vienna.

The Jodrell Laboratory.

As in previous years, plant-material of various kinds was examined microscopically, with the object, in most cases, of identifying the material from its anatomical structure, identification being carried out as far as possible. The material consisted of numerous specimens of wood, bark, fibre, etc., these being largely economic products, but included a further collection of ancient Egyptian specimens of wood, and some other objects of archaeological interest. Some experiments were also made on methods of using carbolic acid and creosote, when examining fibres and other materials microscopically.

Mr. C. J. A. Berkeley was engaged in carrying out inoculation experiments to ascertain whether a certain disease of Rhododendrons is due to a fungus isolated from affected plants.

Miss Manton made some observations on the pollen of *Empetrum nigrum*.

Miss K. E. Ritson carried out some experiments with the object of determining the effects of ultra-violet rays on temperate greenhouse-plants, and began work on an investigation into the morphology, anatomy and physiology of reproduction in the Ground-nut, *Arachis hypogaea*, L.

Dr. L. Rogers prepared material for cytological work, and made a preliminary study of the chromosomes in the spore-mother-cells and root-tips of certain members of the *Schizaeaceae*.

Dr. C. W. Wardlaw, as part of a research on the size-factor in plants, studied differences in complexity of structure in roots of small and large size, in relation to physiological requirements.

Mr. W. C. Worsdell made a comparative study of the anatomy of a number of fasciated plants and of normal plants of *Campanula carpatica*, on behalf of the John Innes Horticultural Institution, Merton, where the plants were grown.

Mycological work was also carried out by members of the

Herbarium Staff, numerous cultures of Fungi being made, in some cases as an aid to the identification of doubtful material, and in others as part of the research work on *Cercosporella* and other Fungi, referred to in the Herbarium report, see p. 28.

Herbarium.

The relief of the congestion in cabinet space by the provision of some 160 additional cabinets was one of the chief events of 1926. The work of incorporating these cabinets into blocks was difficult (*K.B.* 1925, Appendix 1, p. 18), and at times it very seriously impeded both the work of routine and research, since all the cabinets involved had to be emptied and the specimens accommodated elsewhere (sometimes for several weeks), as facilities best allowed. Constant supervision as to the replacement and re-arrangement of the material had moreover to be maintained. In spite of these delays and inconveniences a very satisfactory amount of routine work was accomplished, and the number of specimens "laid in" during the year exceeded all previous records. Steady and substantial progress was also made in the work of clearing the Store.

The post of Assistant for South Africa, which had been vacant since April, 1921, was filled by the Government of the Union of South Africa by the appointment of Miss I. C. Verdoorn, of the Division of Botany, Department of Agriculture, Pretoria, to date from December 28th, 1925.

Taxonomic research proceeded in various directions, and contributions were made to our knowledge of the floras of various parts of the world, the most noteworthy being in respect to Siam by Professor W. G. Craib, and the Malay Region by Mr. H. N. Ridley, and to Burma by the Assistant for India. With regard to Africa, Part I. of the Flora of West Tropical Africa was completed and sent to the press. An important work by a member of the Staff brought out during the year should be referred to, although it was not an official publication, namely "The Families of Flowering Plants," by Mr. J. Hutchinson.

An event of general botanical interest was the International Congress of Plant Sciences held at Ithaca, New York, in August. This was attended by the Director, Mr. Sprague and Miss Wakefield, all of whom read papers, while the Director also presented a paper contributed by Mr. Hutchinson.

A summary of the year's work is given below, that on flowering plants being arranged under geographical headings.

Europe and Orient.—*Routine*.—The work of incorporating newly-mounted material and the re-arrangement of that already in the Herbarium has been continued. Approximately 15,000 sheets have been laid in, two-thirds of which were from the Churchill and Wilmott collections in the Store. There is still a large quantity of mounted material, which will be incorporated as soon as cabinet space is available. A very considerable amount

of time has been devoted to the re-arranging of genera and writing up according to monographs. The chief genera which have been so dealt with are:—*Centaurea*, *Linaria*, *Cerastium*, *Holosteum* and *Daphne*.

Amongst important collections which have been named mention may be made of the late Dr. Forsyth-Major's Corsican Herbarium; Mr. B. Gilliat-Smith's North Persian plants, and plants collected by Sir Ronald Lindsay in Asia Minor. The Balkan Peninsula collections have been enriched by a good set of Javorka's and Kümmerle's Albanian plants; a set of rare Bulgarian plants presented by the Department of Botany, Sofia University, and a further contribution by Dr. K. Maly, from Bosnia and Herzegovina. As a result of another visit by Mr. and Mrs. W. B. Turrill to South-East Europe over 600 sheets of dried plants and 200 packets of fruits and seeds from Bulgaria and Thrace were added to the Herbarium. The Rev. E. Ellman again invited Mr. N. Y. Sandwith to accompany him on a month's collecting journey, and areas in South-Central and South-Eastern Spain were worked and some thousand specimens were collected. Contributions of British plants, especially grasses, have been made by various members of the Staff and by several British botanists. Most of the above material has been mounted and a portion has already been laid in.

Mr. E. M. Marsden-Jones presented a fine series of experimental material of *Geum rivale* × *urbanum* hybrids and other *Geum* crosses, each representing several generations. The preservation of such pedigree materials in the Herbarium is of great value in affording a permanent record of genetical research and in elucidating publications. He also presented an extensive series of experimental material of *Centaurea* and *Silene*.

Research and Publications.—The following papers dealing with European and Oriental Floras have been published:—"On the Flora of the Nearer East" (*K.B.* 1926, p. 100, and p. 375), "Revision of Sibthorp's plants at Kew" (*K.B.* 1926, p. 120), "A new Anthemis from Bulgaria" (*Gard. Chron.*, Vol. 80, 1926, p. 120). Work on the Phytogeography of the Balkan Peninsula was continued.

Asia.—*Routine*.—In the Indian Section a very large amount of laying in has been accomplished. The whole of the Duthie Herbarium has now been incorporated and also additional material purchased from the Rev. A. Saulière and the Rev. L. Anglade. An additional 200 sheets of the Rottler collection received from King's College, London (*K.B.* 1926, p. 221), have also been mounted and incorporated. From the Gamble Herbarium, referred to in detail last year (*K.B.* 1926, p. 12), the whole of the grasses, including Mr. Gamble's unique collection of Bamboos, has been extracted and laid in, and the preparation of a few other families for incorporation has been commenced. A considerable number of plants, including many type specimens received from Siam and named by Prof. W. G. Craib, has been placed in the cabinets.

Many small collections from various localities sent to be named have passed through the hands of the Assistant for India, the most important being those received from Mr. R. N. Parker, Imperial Forest Botanist, Dehra Dun, Mr. C. E. Parkinson, Forest Botanist, Burma, and from Mrs. A. D. Parry, from the Lushai Hills of Assam, a tract hitherto almost unexplored botanically. The material received from Mr. Parkinson is especially interesting and important in coming from the little-known province of Tenasserim in Southern Burma and contains many new species. The same botanist also sent a separate collection of 60 specimens of *Flacourtiaceae*. These are of value in connection with investigations into the treatment of leprosy by the use of Chaulmoogra oil obtained from the seeds (*K.B.* 1926, p. 17). The specimens proved to belong to four separate species, and an account of the whole collection is in preparation.

In the Chinese section considerable progress has been made with the mounting of the accumulation in the Store. A certain number of specimens has been laid in, but a large residuum of nearly 8000 specimens has, owing to the shortage of cabinet space, been temporarily sorted and arranged in family sequence. These include collections made by Farrer, Forrest, Handel-Mazzetti and Schindler as well as the Japanese and Korean specimens mentioned below. Considerable time has also been devoted to the re-arrangement and writing up of several important Chinese genera.

With regard to naming, the remainder of Père Licent's Northern China collection has been dealt with, also E. H. Wilson's collections made in Japan and Korea on behalf of the Arnold Arboretum, and several small collections such as Taquet's Korean plants and Sir Aurel Stein's recent specimens from Chinese Khotan.

In the Malayan division a number of consignments of Siamese plants continue to come to hand from Dr. A. F. G. Kerr, and, with the exception of special groups, are referred to Prof. W. G. Craib for determination. Some 200 grasses and 150 ferns were named at Kew. A valuable series of Pierre's specimens from Cochin China were received as duplicates from Paris, including examples of his new species and genera not hitherto represented at Kew, together with reproductions of drawings and dissections. These are being sorted as quickly as opportunity allows, the grasses already having been extracted, mounted and laid in.

A considerable amount of work was accomplished in splitting up and arranging the Malayan material according to the new subdivisions recently adopted in the Herbarium. Progress has also been made in the Stores. The sorting into families of the two principal collections awaiting attention, namely those of E. D. Merrill and A. D. E. Elmer, has been completed, and the specimens, though still mostly unmounted, are more readily accessible for study.

Research and Publications.—The lamented death of Mr. J. S. Gamble left the preparation of the Flora of the Presidency of

Madras unfinished, the 7th part being the last to be published. The Government of Madras has agreed to the Flora being completed by the Assistant for India in the Herbarium at Kew, and the work of elaboration, beginning with the family *Urticaceae*, was commenced during the year.

Connected with the Indo-Malayan region the following papers appeared:—"The Flora of the Mentawi Islands," by H. N. Ridley (*K.B.* 1926, p. 57), including 55 new species and 1 new genus; "Additions to the Flora of Malaya," by H. N. Ridley (*K.B.* 1926, p. 469), including 23 new species; "Contributions to the Flora of Siam" by W. G. Craib, Additamentum xviii (*K.B.* 1926, p. 154), Additamentum xix (*K.B.* 1926, p. 337), the two comprising a total of 72 new species; "Contributions to the Flora of Burma," by the Assistant for India (*K.B.* 1926, p. 446), with 20 new species.

In the Chinese section the principal work has been the enumeration and preparation for publication of the collection made by Captain F. Kingdon Ward in 1924 in the Eastern Himalayas and Southern Tibet. The work on the revision of Chinese species of *Gentiana* has been continued and is approaching completion.

Africa.—*Routine*.—The Store work has proceeded satisfactorily, some 10,000 sheets having been mounted, 6000 laid in, and 2000 named. Temporary sortings into families have also been made, especially in the case of Gossweiler's Angolan collection, the main set of which is at the British Museum, where it is being worked out. As regards current work, with few exceptions all new collections received from Africa during the year have been determined and identifications supplied, the South African material being named in conjunction with the Assistant for South Africa. Some 620 critical *Compositae* were dealt with, about half of which had been sent for naming by the Chief of the Division of Botany at Pretoria. As was the case last year, the bulk of the material received for naming during 1926 was from East Africa.

In addition opportunity has been taken to re-arrange several large genera to facilitate reference, such as *Tephrosia*, *Rubiaceae* tribe *Vanguerieae*, *Psychotria*, and *Acacia*.

Work was also continued on the re-arrangement of African orchids, and the genus *Polystachya* was written up and arranged according to Kränzlin's monograph. The determination of a large collection of orchids made in Katanga, Belgian Congo, received from Pretoria, was begun, but owing to the extremely critical nature of the material many types had to be borrowed from continental herbaria and progress has been unavoidably slow. It is evident that the collection contains many novelties. Considerable attention was also paid to Grasses as regards the writing up of sheets and covers. Over 1000 sheets of South African and Tropical African grasses were named and some 2000 sheets were laid in.

Research and Publications.—As was the case last year the chief

work has been the preparation by Mr. J. Hutchinson and Dr. J. M. Dalziel, Assistant for West Africa, of "The Flora of West Tropical Africa," the first part of which is now in the press. In this connection the large and difficult families *Tiliaceae*, *Sterculiaceae*, *Malvaceae* and *Euphorbiaceae* have been worked out, and also the *Caesalpiniaceae*. The *Mimosaceae* are now in hand, and with the completion of the *Papilionaceae* the bulk of the more troublesome families will have been dealt with, the majority of the other families being included in the later and more up-to-date volumes of the Flora of Tropical Africa. Drawings for the flora have been prepared up to the end of the *Metachlamydeae*.

The following papers appeared during the year: "A Revision of *Englerastrum*," by Mr. A. H. G. Alston, now Systematic Botanist at Peradeniya, Ceylon (*K.B.* 1926, p. 295), and the following papers by various members of the staff, "Notes on *Kissenia* and the Geographical Distribution of the *Loasaceae*" (*K.B.* 1926, p. 174), "*Harpagocarpus*: A New Genus from Uganda" (*K.B.* 1926, p. 363), "African Leather Dyes" (*K.B.* 1926, p. 225), and a further note on "The Genus *Englerastrum*" (*K.B.* 1926, p. 479).

The Assistant for South Africa commenced a revision of the genus *Crotalaria* as represented in South Africa, Nyasaland, Portuguese East Africa, Rhodesia, and South-West Africa, and a paper by her on the African *Toddalieae* was prepared and published (*K.B.* 1926, p. 389).

With regard to grasses, definite progress was made with the last part of the Flora of Tropical Africa. A small booklet entitled "East African Pasture Plants," prepared at Kew, was published, and is on sale by the Crown Agents for the Colonies (*K.B.* 1926, p. 256). The publication of a new series of articles entitled "Notes on African Grasses" was initiated, and during the year the following contributions appeared:—No. I, Descriptions of new species (*K.B.* 1926, p. 246); No. II, *Bromuniola* gen. nov. (*K.B.* 1926, p. 366); No. III, New species of *Melinis* (*K.B.* 1926, p. 440).

Two papers were published on Orchids, one on "New Polystachyas" communicated by Dr. F. Kränzlin and based entirely on Kew material (*K.B.* 1926, p. 288), and the other, "Angraecoid Orchids", arising out of the difficulty experienced in naming the African material of *Sarcantheae* at Kew, was prepared by Major K. W. Braid (*K.B.* 1926, p. 323).

America.—*Routine*.—Special attention was paid to South America, various collections from British Guiana, Colombia, Ecuador, Uruguay and Argentina having been named, in addition to others from Mexico and Trinidad. Among the more interesting was Mr. H. F. Comber's collection from the Neuquen Territory, Argentina, which is remarkable for the very fine condition of the specimens, and forms a notable addition to our material from that part of the Andes. A large amount of South American material from the Store, chiefly from French Guiana and the Amazons, has been passed through all stages and incorporated in the

Herbarium. Numerous genera, chiefly belonging to the *Araceae* and the families of *Bicarpellatae*, have been written up and arranged in accordance with recent monographs and revisions. The Carey Herbarium of North American plants, which, on account of the larger size of the herbarium sheet, is kept apart from the general collections, has been re-arranged so as to render it more readily available for consultation.

Research and Publications.—Among the investigations undertaken was a revision of the genus *Doliocarpus*, written in collaboration with Mr. R. O. Williams, Assistant Botanist, Dept. of Agriculture, Trinidad, with whom also numerous new species of *Rubiaceae* were described in preparation for a Flora of Trinidad which is being prepared by the Trinidad botanists.

The appearance of accounts of Humboldt and Bonpland's Itineraries in Colombia, Ecuador and Peru (*K.B.* 1926, p. 23, p. 181) rounds off our knowledge of these authors' travels in Tropical America, and makes it possible to identify the type-localities of species described by them. The publication by the Mexican Society of Natural History and the Mexican Government, during the period 1887-1897, of Sessé and Mociño's "Plantae Novae Hispaniae" and "Flora Mexicana," which were written about a century previously, led to difficulties of various kinds, as it was doubtful in numerous cases whether particular species were regarded as new by Sessé and Mociño, and many of the localities cited could not be found. These difficulties have been largely removed by an intensive study of "Sessé and Mociño's Plantae Novae Hispaniae and Flora Mexicana" (*K.B.* 1926, p. 417).

Other papers published with reference to American plants included "Taxonomic and Genetic notes on some species of Nemophila" by Messrs. R. J. Chittenden and W. B. Turrill (*K.B.* 1926, p. 1) and a "Revision of the genus Calycolpus" by Mr. L. A. M. Riley (*K.B.* 1926, p. 145).

Australasia.—*Routine*.—The work on the already determined material in the Store has been continued with the result that with the exception of a very large collection of New Caledonian plants received recently from Paris, the whole of the named material has been incorporated in the Herbarium or has been sorted and is awaiting incorporation when cabinet space is available. Together with current collections about 4000 specimens have been dealt with in this way. Work has also commenced on the writing up and putting in order of Australian material of several large families some of which do not appear to have been dealt with since the "Flora Australiensis" was compiled. These include *Proteaceae*, *Myrtaceae*, *Epacridaceae*, *Stylidiaceae* and *Goodeniaceae*, whilst a start has also been made with *Leguminosae* and *Compositae*.

There has been a material increase in the number of queries received from the State herbaria in Australia and the correspondence which has resulted therefrom has been somewhat heavy, inasmuch as it has involved the borrowing of types from continental herbaria.

Portions of types and co-types of various new species have also been presented from Australia to Kew, and are very valuable additions. This increased correspondence with the State herbaria is a welcome sign of closer co-operation.

A valuable set of species, forms, and hybrids of New Zealand Celmisias was received from Dr. Cockayne. It is of special interest as it is copiously annotated by Dr. Cockayne, Mr. T. Kirk, and the late Mr. T. F. Cheesman.

Research and Publications.—The revision of the Australian species of *Frankenia* has been continued, and the examination of much material and several type specimens received on loan from various sources has been practically completed, and the paper is now in the course of preparation.

In response to a query from Professor A. J. Ewart, an investigation is being conducted into the identity and nomenclature of 77 species of Australian *Myrtaceae* described by Turczaninov in 1852, and omitted by Bentham from the "Flora Australiensis."

At Mr. W. Greenwood's suggestion, a paper dealing with the grasses of Fiji, giving a synopsis and key, has been prepared for publication in the Kew Bulletin.

The following papers were published: "The Taxonomic position of *Hoheria Lyallii*" (*K.B.* 1926, p. 214), "A New *Solanum* from Western Australia" (*K.B.* 1926, p. 116). Mr. L. A. M. Riley also contributed a short paper entitled "Notes on the Flora of Rapa" (*K.B.* 1926, p. 51).

Ferns, Mosses and Hepaticae.—Considerable progress has been made in re-arranging the ferns according to Dr. C. Christensen's "Index Filicum" and about one-fifth has been sorted into the sequence of that work, while many others have been written up as a necessary preliminary to such re-arrangement. Various collections have been incorporated in the herbarium, including that of the late Mr. J. S. Gamble, amounting to 2822 sheets, which, although chiefly Indian, included European and South African specimens. Certain collections of which duplicates had been distributed under provisional names have been more exactly identified and the determinations distributed; these include J. Cavalerie's Chinese, W. Hancock's Hawaiian, Sumatran and Ceylonese and Ed. André's Colombian specimens. Many of the ferns from the large collections made in Siam by Dr. A. F. G. Kerr have been worked out and it is hoped that the rest may be dealt with shortly. Other collections which have been named include: G. Forrest, China; L. Gibbs, Corea; Dr. G. Bryce, New Guinea; Dr. Dunlap, Cameroons; J. Gonzalez Ortega, Sinaloa; and E. Langlasse, Mexico.

Of Mosses and Hepatics, various sets have been incorporated in the Herbarium and some of the newer genera written up and separated out. Naming has proceeded as far as time permitted. An interesting collection of about 460 British Mosses made by the late Rev. W. E. Thompson has been presented by his niece, Miss

M. G. Noyle. Many of these are from Norfolk and are of historic interest, in that they formed the basis of the lists published by Mr. H. N. Dixon in the Transactions of the Norfolk Naturalists' Society, vol. vii. (1903).

Algae and Lichens.—A large collection of Marine Algae made by Col. H. H. Johnston in the Orkneys was examined and named. Amongst other contributions presented and worked out may be mentioned a set of critical Gigartinas from New Zealand, sent by Mr. R. M. Laing of Christchurch, and a miscellaneous collection from Ceylon forwarded by Mr. A. H. G. Alston. One of the most interesting was a small collection from Spitsbergen collected during the British Arctic Expedition of 1925 by Mr. J. W. S. Marr, and brought to Kew by Prof. W. G. Craib. Mr. J. Groves has kindly identified many *Charophyta*, and the whole group has been rearranged in geographical order.

With regard to Lichens, Miss D. Powell was especially employed for a short time to continue the arrangement of saxicolous species according to Zahlbruchner's monograph. Kew is greatly indebted to Mr. R. Paulson for his voluntary assistance in naming, on the occasions of his weekly visits, certain difficult and critical species which were received for determination during the course of the year. A small collection of Lichens, collected on the British Arctic Expedition mentioned above, was also dealt with by him, and a selection of specimens of both algae and lichens have been incorporated in the Herbarium.

Fungi.—*Routine*.—In addition to general correspondence an increasing amount of time is occupied in giving expert assistance to other workers, in particular on such matters as the examination of type material, the naming of critical species and questions of nomenclature.

The principal collections dealt with included a set of Australian Clavarias from Dr. J. B. Cleland, a large collection of Cameroons fungi made by Dr. Dunlap and presented by Messrs. Elders and Fyffes, and several tropical collections on behalf of the late Dr. C. G. Lloyd. Numerous additions to the Herbarium have been made, including a set of miscellaneous fungi collected by Miss Wakefield during the International Congress at Ithaca, and various new or critical British fungi obtained during forays.

Research and Publications.—Work was continued on the life history of *Rhizoctonia Crocorum* and a paper on the subject was presented at the International Congress at Ithaca. The investigation of the life-history of *Cercosporella Antirrhini* was completed and the results published (Trans. Brit. Myc. Soc. xi. 1926.)

The taxonomic investigation on the genus *Vermicularia* and its allies was continued, several new forms having been obtained which are being grown in pure culture. A paper entitled "Fungi from Kenya Colony," being a complete list of the fungi known from that Colony, was published (*K.B.* 1926, p. 305). A new edition of the Ministry of Agriculture's "Handbook of Edible

and Poisonous Fungi" was prepared, several new plates being provided.

An enquiry was conducted with regard to a very severe outbreak of *Melampsora larici-populina* which occurred in a collection of poplars in Herefordshire, and a comparison made with outbreaks elsewhere.

STOREHOUSE.—Four botanists and eight preparers were employed as before for the four continents from which most material still awaits attention. For the fifth continent, Australasia, no special Assistant has been allotted but help was provided whenever possible by Temporary Technical Assistants or in other ways. It is satisfactory to record that in spite of being considerably hampered by cabinet alterations, very satisfactory work has been carried out in connection with all five continents and that for the two most important items, namely mounting and laying in, the figures returned exceed those of last year. Some details of the work will be found under the geographical headings above, whilst the figures for mounting, etc., are included in the table in the next paragraph.

SUMMARY OF ROUTINE.—The following table summarises the routine work, apart from naming, accomplished by the regular staff and by the special Store staff during 1926, the lower Cryptogams being excluded:—

Mounted	87,400
Incorporated in the Herbarium ...	47,792
Duplicates distributed	3,496
Specimens received on loan	2,942
Specimens sent out on loan	1,604

SEEDS AND CARPOLOGICAL COLLECTIONS.—Nearly 600 boxes of seeds have been added to the Seed Collection. These include 465 specimens presented by Mr. C. E. Hubbard, which consist chiefly of seeds from Northern India and of rare garden plants cultivated in this country. Some 30 boxes of fruits have been added to the Carpological Collection, and 285 specimens of Monocotyledonous fruits have been transferred from the Museums, but their incorporation has been postponed until further accommodation becomes available.

NOMENCLATURE.—Mr. T. A. Sprague attended the International Congress of Plant Sciences at Ithaca as an official delegate on questions of nomenclature.

In order to expedite the solution of the problems brought before the Congress a considerable amount of preliminary work was carried out at Kew, and the following papers were published:—"Alphabetical List of Nomina Rejicienda (Phanerogamae)" included in the second edition of the International Rules (*K.B.* 1926, p. 128). This supplements the "Alphabetical List of Nomina Conservanda" which appeared in 1921, and by the aid of these two lists it is possible to ascertain at a glance whether a given generic name is or is not conserved or rejected. The

absence of any provision for the application of conserved names in the event of generic segregation was remedied by the preparation of a paper on "Standard-species of Nomina Conservanda." In this paper a standard-species—usually the type-species, but sometimes a substitute-species—has been suggested for each of the conserved names, reasons for the selection being supplied in all cases.

In the opinion of competent authorities disagreement in the application of generic names (other than conserved names) is likely to be responsible for greater divergence in nomenclature than any other cause, and the adoption of standard-species for the more important generic names is therefore of immediate practical importance. The general question of what Rules would be suitable as a guide to the selection of standard-species was accordingly discussed in a paper on "Standard-species" (*K.B.* 1926, p. 96).

Among the proposals and papers on Nomenclature brought before the Congress were:—the Resolutions on Nomenclature passed by the Imperial Botanical Conference, London, 1924 (presented by Dr. A. B. Rendle); the Resolutions of the Committee on Australian Botanical Nomenclature (Journ. Bot. 1925, p. 210; *K.B.* 1925, p. 343); the paper on "Standard-species of Nomina Conservanda," mentioned above; and a paper on "Principles and Problems of Plant-Nomenclature."

The Ithaca Congress afforded excellent opportunities for the exchange of views on nomenclature as well as on other subjects, and for ascertaining the general trend of botanical opinion. A large majority of the delegates seemed to be in favour of more complete agreement as to the Rules of Nomenclature, and a representative Committee was appointed to consider proposals for amending the International Rules and to make recommendations to the next International Congress to be held in England in 1930 (vide Science, n.s. lxiv. p. 290, Sept. 24, 1926).

A schedule comprising thirty-one suggested new Nomina Conservanda, with the reasons for their conservation, has been prepared at Kew and has been sent to each member of the new International Committee and to others, thus affording an opportunity for raising objections, amendments and additions before the schedule is formally presented for the consideration of the Committee. It is hoped that in this way it may be possible to bring forward a list which will meet with general approval.

Index Kewensis.—In April, 1926, the VIth Supplement of the Index Kewensis covering the period 1916–1920 was published. This volume contains about 32,000 references to new names, many of which were published during the years 1914–1915, but owing to the war were not available for insertion in Supplement V.

During the past year considerable progress has been made in the preparation of Supplement VII, quinquennium 1921–25. Over 13,000 entries have been added to the Card Catalogue. Certain periodicals, not received at Kew, have had to be examined

at the British Museum (Natural History), South Kensington, and the number of new names extracted from these journals was over a thousand. In addition to these, several old works or parts of old works not searched hitherto for the compilation of the Index were examined and many additional names have been recorded. Amongst these may be mentioned:—Pierre, Flore Forestière de la Cochinchine (1879–1907) K. Koch, Hortus Dendrologicus (1853) and Sessé and Mociño's Plantae Novae Hispaniae and Flora Mexicana. The two former were the subjects of notes under "Additions to the Index Kewensis" (*K.B.* 1926, pp. 30–32; 211–214), and from these three about a thousand names were extracted. Up to the present the total number of references prepared for Supplement VII. amounts to about 22,000. All the reference cards are in duplicate, one set being required for the Press, whilst the other forms the basis of a permanent Card Catalogue at Kew into which later Supplements will successively be incorporated.

Experimental Ground.—The importance of the experimental plot is increasingly evident. Over two hundred species have been grown and studied during the past year, and about 300 sheets have been prepared and laid in the Herbarium, in addition to a large number of duplicate sheets kept for purposes of exchange.

In the genus *Veronica* considerable attention was paid to the *spicata* group, and the following species were studied in detail in all stages from seedling to fruit; *V. spicata* L., *V. orchidea* Crantz and *V. euxina* Turrill. Many constant characters were found which had not been recorded from a study of herbarium specimens. *Veronica thracica* was also grown from two wild sources and its interesting life-history ascertained. In connection with the breeding work on *Silene angustifolia* and allied species (which is being carried out in conjunction with Mr. E. M. Marsden-Jones at Potterne), various collections of *Silene* were grown and studied. Cultures of species of *Verbascum* were continued, as were also the investigations on numerous variations exhibited by *Epilobium angustifolium*.

Investigations on the method of hibernation in certain rust-fungi were also commenced.

As a result of the meeting of the Genetical Society held at Kew in June the distribution of "pure" material of known origin, for breeding and cytological research, was arranged with several specialists and with institutions engaged in genetical work.

Visitors.—About 4820 visits have been made to the Herbarium during the year. Amongst those who have paid frequent visits or made a prolonged stay were:—Mr. E. G. Baker, British Museum (African *Leguminosae*); Mr. Frank Barker, Agricultural Department, Nyasaland Protectorate (*Sorghum*); Miss A. M. Bottomley, Division of Botany, Pretoria (Mycology); Prof. F. O. Bower (Ferns); Mr. N. E. Brown (South African plants); Mr. I. H. Burkill (Malay Peninsula plants); Miss M. E. J. Chandler (Fossil seeds and fruits); Mr. H. F. Comber (Plants of Argentine Andes); Prof. R. H. Comp-

ton, National Botanic Garden, Cape Town (South African and New Guinea plants); Mr. B. O. Coventry, Indian Forest Service (Cashmir plants); Prof. W. G. Craib, University of Aberdeen (Siamese plants); Mr. E. D. Darlington, John Innes Horticultural Institution, Merton (*Prunus* spp.); Dr. J. Burtt Davy, Imperial Forestry Institute, Oxford (Flora of the Transvaal); Mr. H. N. Dixon, Northampton (Mosses); Mr. A. W. Exell, British Museum (miscellaneous); Mr. H. C. Fourcade, South Africa (South African plants); Mr. J. Fraser (Garden plants); Miss E. T. Geddes, University of Aberdeen (Siamese plants); Mr. B. Gilliat-Smith, Tabriz, Persia (Persian plants); Mr. R. D'O. Good, British Museum (miscellaneous); Mr. P. J. Greenway, Imperial Forestry Institute, Oxford (Transvaal plants); Mr. W. B. Grove, Birmingham (Fungi); Dr. Alfred Gunderson, Botanic Garden, Brooklyn, New York (*Frankeniaceae*, Nomenclature); Mr. L. Hall, Messrs. Cross and Bevan's Laboratories (Plant Chemistry); Mr. M. R. Henderson, Singapore Botanic Gardens (Malay plants); Prof. A. Henry, University College, Dublin (Forestry); Dr. D. Hooper, late of Indian Museum, Calcutta (Chinese drugs); Mr. F. R. Irvine, Achimota College, Accra, Gold Coast (Gold Coast plants); Mr. A. Bruce Jackson (Garden Shrubs); Dr. Ivan C. Jagger, Experimental Station, Chula Vista, California (Pathology); Prof. W. L. Jepson, University of California, Berkeley (Flora of California); Miss Mia C. Karsten, Terborg, Gelderland, Holland (Succulents); Prof. G. Koidzumi, Botanical Institute, Imperial University, Kyoto, Japan (Flora of Japan); Prof. Y. Kudo, Hokkaido Imperial University, Sapporo, Japan (Flora of Formosa); Prof. John M. Macfarlane, Philadelphia (*Nepenthes*, etc.); Mr. E. M. Marsden-Jones, Potterne (Genetics); Mr. T. H. Marshall, Dar-es-Salaam (Tanganyika plants); Mr. E. W. Mason, Imperial Bureau of Mycology (Fungi); Mr. R. E. Massey, Department of Agriculture, Khartoum (Grasses); Prof. B. Miyazawa, Miyazaki Agricultural College, Miyazaki, Japan (Genetics); Mr. Spencer Moore, British Museum (various); Prof. C. E. Moss, University of Witwatersrand, Johannesburg (South African *Chenopodiaceae* and *Thymelaeaceae*); Mr. S. K. Mukerji, Lucknow University, United Provinces, India (Flora of Kashmir); Mr. C. Norman (Tropical African *Umbelliferae*); Dr. Alice M. Ottley, Wellesley College, Wellesley, Mass. (*Hosackia*); Mr. R. N. Parker, Dehra Dun (*Dipterocarpaceae*); Mr. R. Paulson, Pinner (Lichens); Dr. R. Lloyd Praeger, Dublin (*Sempervivum*); Mrs. Clement Reid, Milford-on-Sea (Fossil seeds and fruits); Mr. H. N. Ridley, Kew (Plants of Borneo and Sumatra, Distribution of Seeds); Dr. and Mrs. A. J. Riker, University of Wisconsin, Madison, U.S.A. (Bacterial Diseases); Mr. L. A. M. Riley (Plants of "St. George" Expedition); Dr. Geo. H. Rodman (Insectivorous plants); Mr. J. Roffey (*Hieracium*); Mr. C. E. Salmon, Reigate (British plants); Mr. J. R. Shabetai, Ministry of Agriculture, Giza, Cairo (Flora of Egypt); Mr. N. Douglas Simpson, The Cotton Research Board, Giza, Cairo (Egyptian plants); Miss Lilian Snelling (Botanical

Magazine); Dr. O. Stapf (Botanical Magazine, Pritzel's Index Iconum); Capt. F. Kingdon Ward (Flora of Tibet); Mr. R. O. Williams, Royal Botanic Gardens, Trinidad (Flora of Trinidad); Dr. and Mrs. T. G. Yuncker, de Pauw University, Greencastle, Indiana (*Cuscuta*).

As in previous years, Dr. O. Stapf and the staff working under him on the Botanical Magazine and on the new edition of Pritzel's Index Iconum were accommodated on the top floor of the Library. Thanks are due to Dr. Stapf for assistance in various directions, especially in connection with the naming of species of *Ephedra* and of *Gramineae*.

Mrs. Clement Reid and Miss M. E. J. Chandler have made several stays at Kew comparing Oligocene and Eocene fruits and seeds with recent material, especially in connection with their work on the Bembridge beds and the flora of London clay (Catalogue of Cainozoic Plants Vol. i. The Bembridge Flora, British Museum, Natural History).

In the Indo-Malayan field Mr. R. N. Parker, Imperial Forest Botanist of Dehra Dun, stayed at Kew for a month during his leave working out some difficulties connected with *Dipterocarpaceae*. Mr. H. N. Ridley continued work with Malayan plants and contributed two important papers to the Bulletin (see Research, p. 24). He also studied material in connection with his forthcoming work on seed-distribution. Mr. I. H. Burkill was engaged in compiling his "Dictionary of Economic Products of the Malay Peninsula," in which he was assisted by Dr. D. Hooper, late Curator of the Indian Museum, Calcutta. Kew is indebted both to Mr. Ridley and Mr. Burkill for help on various questions concerning Malayan plants.

In addition to naming Kew material sent to Aberdeen throughout the year, Prof. W. G. Craib spent a large part of his summer vacation at the Herbarium working out doubtful points in various Siamese plants. Miss E. T. Geddes, of Aberdeen University, who was awarded a Kilgour Scholarship in Natural Science for two years, decided to spend a year at Kew and commenced work in September on the Siamese flora *Rosaceae* to *Rubiaceae*.

Amongst the Japanese visitors of the year lengthy stays were made by Prof. Y. Kudo (recently appointed Professor of Botany in the Botanical Institute of Taipeh University, Formosa), who studied particularly Formosan botany, and by Prof. Koidzumi, an authority on the flora of Japan, who was chiefly interested in examining the old type specimens of Japanese species.

Mr. B. Gilliat-Smith spent much time at Kew working out an interesting collection of about 500 plants made by him in the neighbourhood of Tabriz in Northern Persia and which he had generously presented to Kew.

Africa was represented by Prof. R. H. Compton and Prof. C. E. Moss, who were at work chiefly with South African *Compositae* and *Chenopodiaceae* respectively, also by Mr. H. C. Fourcade, who, was occupied with the determination of various critical South African plants.

Mr. N. E. Brown was engaged in working out the South African *Iridaceae*, and Thunberg's type specimens of *Moraea*, *Aristea* and *Antholyza* were kindly sent on loan to Kew for this purpose by Prof. H. O. Juel of Upsala. He also continued his work on *Mesembryanthemum* and published his results in the Gardeners' Chronicle, where it will be seen he has founded many new genera.

Mr. P. J. Greenway, of the Imperial Forestry Institute, Oxford, visited Kew during the vacations, naming specimens of various African forest trees on behalf of the Institute.

For the first half of the year Mr. J. R. Shabetai, of the Egyptian Ministry of Agriculture, was engaged in examining the Egyptian material in the Herbarium in connection with his proposed work on the Flora of Egypt.

American visitors were fewer than during recent years, but Prof. J. M. Macfarlane made a prolonged stay, working partly with species of *Nepenthes*, but chiefly at the biological relationships in various groups of plants. Prof. W. L. Jepson, of the University of California, spent some weeks at Kew working on critical plants of the Californian flora. Mr. H. F. Comber brought with him a fine collection of plants from the Argentine Andes, the first set of which was generously presented by the Royal Botanic Garden, Edinburgh. Mr. Comber spent some time in the Herbarium at work at the collection before setting out on his second expedition.

Mr. R. O. Williams, Assistant Botanist, Department of Agriculture, Trinidad, spent two months of his leave at Kew, working chiefly at the *Dilleniaceae* in connection with the Flora of Trinidad.

Miss Muriel Whiting gave her services as a volunteer worker for three months, and was engaged chiefly in the work of re-arrangement of the Malayan material.

Additions to Herbarium.—The total number of specimens received during 1926 was about 23,132, of which 4548 were purchased. (This is somewhat less than usual, though the excessively high figure for 1925 was due to the acquisition of the Gamble Herbarium). The chief sources from which they were obtained were as follows:—

Europe.—*Presented:* Britain, by Messrs. E. Thurston, C. E. Hubbard, T. A. Sprague, L. A. M. Riley, E. Marsden-Jones, and W. R. Sherrin; British mosses (coll. the Rev. W. E. Thompson), by Miss M. G. Noyle; South Spain, by the Rev. E. Ellman and Mr. N. Y. Sandwith; Poland, second Century of Fungi, by Dr. W. Siemaszko; Balkan Peninsula, by Mr. and Mrs. W. B. Turrill, Dr. K. Maly, Prof. N. Stojanoff and Mr. B. Stefanoff; Flora Roumaniae Exsiccatae, Cent. 6, by Prof. A. Borzi; Crimea, by Mr. G. V. Keintz.

Purchased: Trustees of the Saffron Walden Museum, Lord Bute's British Herbarium; Dr. E. M. Reineck, Violas and Centaureas; Drs. J. B. Kümmerle and S. Javorka, Iter Albanicum.

ORIENT.—*Presented:* Turkey in Asia, by Sir R. C. Lindsay; Persia, by the Hon. H. G. Chick and by Mr. B. Gilliat-Smith.

NORTH AFRICA.—*Presented:* Egyptian Gossypiums, by the Royal Botanic Garden, Edinburgh.

NORTHERN ASIA.—*Presented:* Turkestan, by the University of Central Asia.

CHINA AND JAPAN.—*Presented:* China (coll. Mr. G. Forrest), by the Royal Botanic Garden, Edinburgh; (coll. Mr. J. F. Rock), by the United States National Museum, Washington; (coll. Mr. Warburg), by the Botanic Garden, Berlin; Western China (coll. Dr. H. Freiherr von Handell-Mazzetti), by the collector, and (coll. Rev. E. E. Maire) by the Arnold Arboretum; Rhododendrons (coll. Mr. G. Forrest), by the Royal Botanic Garden, Edinburgh; various localities, by the Muséum National d'Histoire Naturelle, Paris; Corean Ferns, by Mr. L. Gibbs.

INDIA AND CEYLON.—*Presented: Dipterocarpaceae* by Mr. R. N. Parker; *Charophyta* by Mr. G. O. Allen; Assam, by Mrs. A. D. Parry; Scinde (coll. Lady Frere), by Miss L. Frere; Madras, by the Rev. L. Anglade, and by the Madras Forest College; Burma, by Mr. C. E. Parkinson and the Muséum National d'Histoire Naturelle, Paris; Ceylon (coll. Mr. A. H. G. Alston), by the Department of Agriculture, Ceylon.

MALAY PENINSULA.—*Presented:* Various, by the Botanic Garden, Singapore, and Mr. H. N. Ridley.

INDO-CHINA.—*Presented:* Siam (coll. Dr. A. F. G. Kerr, Mr. W. R. S. Ladell, Noi Put and Mr. D. Bourbe-Borrowea) by Dr. A. F. G. Kerr; (coll. Phra Winit Wanadorn) by the Siamese Forestry Service; by Mrs. D. J. Collins.

MALAY ISLANDS.—*Presented:* Java, by the Botanic Garden, Buitenzorg.

NEW GUINEA.—*Presented:* (coll. Mr. C. E. Lane-Poole), by Mr. C. T. White.

AUSTRALIA.—*Presented:* various, by Mr. C. T. White; New South Wales, by Dr. F. A. Rodway; Frankenias and Asperulas, by the Botanic Garden, Sydney; Frankenias, by the Victoria National Herbarium and Prof. T. G. B. Osborn.

NEW ZEALAND.—*Presented: Hymenophyllaceae*, by Dr. H. H. Allan.

POLYNESIA.—*Presented:* New Caledonia (coll. Mr. C. E. Lane-Poole) by Mr. C. T. White; (coll. Messrs. C. T. White, L. Brass and I. Franc) by the Arnold Arboretum; Cryptogams from various islands, by Prof. W. A. Setchell.

TROPICAL AFRICA.—*Presented:* French Guinea, by Mr. C. L. Collenette; Sierra Leone, by Mr. F. G. Deighton; Gold Coast, by Messrs. C. Vigne, F. R. Irvine, W. K. Bunner, W. C. Fishlock and F. N. Howes; Cameroons (coll. Dr. Dunlap)

by Messrs. Elders and Fyffes; Belgian Congo (coll. Mr. F. C. M. Vermoesen and others), by the Jardin Botanique de l'État, Brussels, and (coll. Mr. C. W. von Hirschberg), by the Division of Botany, Pretoria; Uganda (coll. Mr. R. Fyffe), by the Forestry Department, Uganda, and (coll. Mr. T. D. Maitland), by the Department of Agriculture; Kenya Colony, by the Forestry Department, and (coll. J. McDonald), by the Agricultural Department. Tanganyika Territory (coll. Mr. A. E. Haarer), by the Department of Agriculture and Messrs. R. L. Davies, B. D. Burtt and F. M. Rogers.

Mascarene Islands.—*Presented:* Mauritius, by Mr. R. E. Vaughan.

South Africa.—*Presented:* Cape Province, *Compositae* and *Cyperaceae*, by Mr. H. G. Fourcade; *Gramineae* and *Cyperaceae*, by Prof. C. E. Moss; Transvaal, by Dr. J. Burtt Davy and the Division of Botany, Pretoria; Natal, by Messrs. Bayer and McClean.

North America.—*Presented:* Nova Scotia and Georgia, *Hepaticae*, by Miss M. S. Brown; Rhode Island (coll. Mr. A. Voccari), by Prof. R. Pampanini; *Fungi*, by Mr. J. S. Boyce; various, by Prof. L. H. Pammel; 9th Century of North American plants, by the United States Department of Agriculture.

Central America.—*Presented:* Mexico, by Senhor J. Gonzalez Ortega, and (coll. Dr. J. Rose) by the United States National Museum; Costa Rica, by Mr. C. H. Lankester.

West Indies.—*Presented:* Trinidad (coll. Mr. W. E. Broadway) by the New York Botanical Gardens; (coll. Mr. R. O. Williams) by the Trinidad Department of Agriculture.

Purchased: Mr. W. E. Broadway, Trinidad.

East Tropical South America.—*Presented:* Brazil (coll. Dr. P. Dusén) by the Rijksmuseum, Stockholm; British Guiana, by the Department of Science and Agriculture; Paraguay, by Mr. C. Osten and Mr. G. Herter.

West Tropical South America.—*Presented:* Colombia, by the Jardin Botanique de l'État, Brussels.

Purchased: Botanic Garden, Berlin, Bolivia (coll. Mr. José Steinbach).

Temperate South America.—*Presented:* Argentine, by Mrs. J. Raynes: Argentine Andes (coll. Mr. H. F. Comber) by the Royal Botanic Garden, Edinburgh; Uruguay, by Dr. F. Felippone.

General.—*Purchased:* Drs. G. Polacci and A. Nannizzi, I Miceti Patogeni, fasc. 5, nos. 41–50.

The original drawings for the late Mrs. E. Vallentin's book on the Falkland Islands have been presented by Messrs. Lovell Reeve and Co.

The Library.

Under this heading are included references to the more important additions to the library received as presentations.

From the Bentham Trustees:—B. Carrichter, *Kräutterbuch . . . darinn begriffen under welchem Zeichen Zodiaci auch in welchem Gradu ein jedes Kraut stehe*, &c., Strassburg, 1601; G. Du Val, *Phytologia, sive philosophia plantarum*, Paris, 1647; F. de Portenschlag-Ledermayer, *Enumeratio plantarum in Dalmatia lectarum*, Vienna, 1824 (13 proof plates, mostly by Rochel, mounted in a folio volume, with MS. notes, also by Rochel, and some printed matter); *Hortus Sanitatis:* Facsimile of Peter Schoeffer's edition, Mainz, 1485, with appendix: *Die Kräuterbücher des XV. und XVI. Jahrhunderts*, by W. L. Schreiber; R. T. Gunther, *Early Science in Oxford*, vol. iii., *The biological sciences, Oxford*, 1925; and A. P. de Candolle, *Plantarum succulentarum historia*, Paris, 1837 [1799–1832]. Some remarks concerning the last named work will be found at the end of the section relating to the library.

A volume of more than ordinary interest and value has been received as a presentation from Captain E. G. Spencer-Churchill, M.C., by whom the work, which was printed by the Oxford University Press in 1925, has been "dedicated and presented to the President and members of the Roxburghe Club." This is entitled *The Herbal of Apuleius Barbarus; from the early twelfth-century manuscript formerly in the Abbey of Bury St. Edmunds (MS. Bodley 130). Described by Robert T. Gunther.* This ancient MS., which is believed to be the earliest Herbal written and illustrated in England, dating from about A.D. 1100, has been reproduced in facsimile by photography. Dr. Gunther has supplied a detailed history of the manuscript and four appendices (I, "The Herbs described in MS. Bodley 130, with Notes"; II, "The Herbarium of Apuleius"; III, "The Book of Extracts from Dioscorides"; IV, "The Medicina Animalium of Sextus Placitus") and an index. Further particulars of this most interesting volume were published in *Nature* of May 1, 1926, p. 617.

Sir Campbell Rhodes, C.B.E., has presented a copy of Mrs. Henry Perrin's handsome work, *British Flowering Plants*. This consists of four quarto volumes, published in 1914, containing 300 full-page coloured plates, reproduced from drawings by Mrs. Perrin, and text by the late Professor Boulger. The edition was limited to 1000 copies. The drawings possess very considerable artistic merit, and Professor Boulger's descriptions and remarks, written in popular language, are excellent, but the work, though so large, is far from being a complete account of British Flowering Plants, as only 290 species are included. A good review of it was published in the *Journal of Botany*, 1914, pp. 134–136.

Four large folio volumes lettered "Prize Oaks of England," containing in all 50 fine photographs of remarkable old oaks, have been presented by the Council of the Royal Photographic Society of Great Britain through the kind offices of Dr. G. H. Rodman.

From Sir William Thiselton-Dyer:—*C. Darwin, *The foundations of the "Origin of Species": two essays written in* 1842 *and* 1844; *edited by F. Darwin*, 1909; H. De Vries, *Plant-breeding*, 1907; *C. R. L. Fletcher, *Edmond Warre*, 1922; O. Heer, *The primaeval world of Switzerland*, 1876, 2 vols.; S. W. Johnson, *How crops feed*, 1870; *E. B. Poulton, *Charles Darwin and the theory of natural selection*, 1896; G. de Saporta, *Origine paléontologique des arbres cultivés ou utilisés par l'homme*, 1888; *Sir R. Strachey, *Catalogue of the plants of Kumaon . . . revised by J. F. Duthie*, 1906; A. R. Wallace, *The world of life*, 1910; and *R. Woodward, *Hortus Arleyensis*, 1907. Autograph letters are inserted in the volumes indicated by asterisks.

From Lieut.-Col. Sir David Prain:—The year's issues, in continuation, of a number of periodicals, including the *Berichte der Deutschen Botanischen Gesellschaft*, *Bulletin de la Société Botanique de France*, *Proceedings of the American Philosophical Society*; *also the Year-Book of Pharmacy . . . and Transactions of the British Pharmaceutical Conference*, 1925, and *The Forests of India*, by E. P. Stebbing, vol. iii.

From Dr. Otto Stapf: *Taschenflora des Alpen-Wanderers*, by L. and C. Schroeter, 1889, and *Coloured vade-mecum to the Alpine flora*, ed. 16 and 17 (in one), by the same authors; also several pamphlets and a typed index to Dr. Handel-Mazzetti's *Plantae novae sinenses*.

The late Mr. J. S. Gamble's working copy of Munro's *Monograph of the Bambusaceae*, 1868, with many additions of printed and manuscript notes, indexes, and a few autograph letters, and his copy of Ruprecht's *Bambuseae*, 1839, have been presented by Mrs. Gamble.

From the Trustees of the British Museum:—*Flora of Jamaica*, by W. Fawcett and A. B. Rendle, vol. v; *Catalogue of the Cainozoic plants in the Department of Geology*, vol. i, *The Bembridge flora*, by Mrs. E. M. Reid and Miss M. E. J. Chandler; *Monograph of the British Lichens*, by Miss A. Lorrain Smith, pt. II, ed. 2.

The Secretary of State for Foreign Affairs has presented through the Ministry of Agriculture and Fisheries a copy of the *Carte phytogéographique de l'Algérie et de la Tunisie*, with text by Dr. R. Maire, published during the year by the Government General of Algeria (Direction of Agriculture, etc.).

Two copies of Mr. J. S. Gamble's *Flora of the Presidency of Madras*, part 7, which was published shortly after his death on Oct. 16, 1925, have been received from the Secretary of State for India.

The publications of the Botanic Garden ('s Lands Plantentuin), Buitenzorg, received in 1926, include the *Annales du Jardin Botanique de Buitenzorg*, vol. xxxv, pte 2, and vol. xxxvi; *The Zoocecidia of the Netherlands East Indies*, by Mrs. J. Docters van Leeuwen-Reijnvaan and Dr. W. M. Docters van Leeuwen; and the 8th part of *Mikrographie des Holzes der auf Java vorkommenden Baumarten*, by Dr. H. H. Janssonius. The Department of Agri-

culture in the Netherlands East Indies has continued to send the *Mededeelingen* of its various sections.

Under the title of *Flora Salvadoreña* the Ministry of Public Instruction of the Republic of Salvador published during 1926 two volumes containing 200 photographs of plants of the republic, with text including short descriptive remarks and the botanical and common names. A few of the photographs are coloured. A copy of this work has been presented by Señor Rodolfo Duke, of San Salvador.

Among the numerous new scientific periodicals which have come into existence during the last few years is *Preslia*, which is published by the Czechoslovak Botanical Society of Prague, from which fascicles 2 and 3 have been received. It contains short papers relating to Czechoslovak botany, in Czech, with summaries in French or English, lists of Czechoslovak botanical literature and biographical notes.

From the Editor of *Nature*:—R. A. Davis, *Citrus growing in South Africa*; J. Halsham, *Every man's book of garden flowers*, and *Every man his own gardener*; A. Handel Hamer, *Wild flowers of the Cape; a floral year*, illustrated; H. Waddington, *Planting directory of Southern India*.

Books received from their publishers, all of which have been briefly reviewed in the *Kew Bulletin*. From the Clarendon Press, Oxford:—H. S. Blunt, *Gum arabic, with special reference to its production in the Sudan*; Sir F. Keeble, *Life of plants: Index kewensis*, Suppl. vi (10 copies). From Country Life:—M. C. Allwood, *Carnations for every garden and greenhouse*; W. J. Bean, *Ornamental trees for amateurs*; R. V. G. Woolley, *Herbaceous borders for amateurs*. From Messrs. Dulau:—W. Dallimore, *The pruning of trees and shrubs*. From Messrs. Longmans:—J. Burtt Davy, *A manual of the flowering plants and ferns of the Transvaal*, etc., pt. 1. From Messrs. Macmillan:—H. H. Hume, *The cultivation of citrus fruits*; J. Hutchinson, *The families of flowering plants*, I, *Dicotyledons*; and *Key to the families of the Dicotyledons*, from the preceding; W. H. Johnson, *Cotton and its production*. From Messrs. Lovell Reeve:—A. W. Darnell, *Winter blossoms from the outdoor garden*.

Most of the publications mentioned in this paragraph are independent works, with a few reprints from journals, which have been presented by their authors unless otherwise stated:—W. G. Attwood and others, *Marine structures: their deterioration and preservation*, 1924 (Report of the National Research Council), (from the National Research Council, Washington); E. Autran and Th. Durand, *Hortus Boissierianus*, 1896 (from Mr. Maurice Barbey de Budé); E. G. Baker, *The Leguminosae of Tropical Africa*, pt. 1; E. Battiscombe, *A descriptive catalogue of some of the common trees and woody plants of Kenya Colony* (from the Government of Kenya Colony); F. Börgesen, *Marine Algae from the Canary Islands*, pt. II; H. P. Brown, *An elementary manual of Indian wood technology*, 1925 (from the Government of India Central Publication Branch, Calcutta); M. E. J. Chandler, *The upper eocene flora of Hordle*,

Hants, pt. I, 1925; R. Chodat, *Scenedesmus: étude de génétique, de systématique expérimentale et d'hydrobiologie*; Miller Christy and Hansford Worth, *The ancient dwarfed oak woods of Dartmoor*, 1922 (from Mr. T. A. Sprague); W. G. Craib, *Florae Siamensis enumeratio*, vol. i, pt. 2 (from the Siam Society, Bangkok); W. Dallimore and others, *The selection and cultivation of hardy trees and shrubs for the public and private gardens at Bournemouth* (from Sir Daniel Morris); J. Burtt Davy, *Manual of the flowering plants and ferns of the Transvaal with Swaziland, South Africa*, pt. 1, and *Handbook of Conifers grown in the Arboretum, Bagley Wood, Oxford*; E. De Wildeman, *Plantae Bequaertianae*, 2 pts., 1924–25, and *Les forêts congolaises et leurs principales essences économiques; East African grasses* (with text by C. E. Hubbard) 4 copies (from the Crown Agents for the Colonies); Federated Malay States, *Proceedings of the Forest Conference*, 1926 (from Mr. Fraser Story); B. Fedtschenko, *Flora Aziatskoĭ Rossiĭ*, pts. 4–11, 13–15, 1914–20; C. E. C. Fischer, *Descriptive list of the forest flora of East-Central Madras*, 1923; G. Forrest, *Some plants, shrubs, and trees found . . . in* 1925 (from Mr. J. C. Williams); G. W. Grabham and R. P. Black, *Report of the mission to Lake Tana*, 1920–21, 1925; U. P. Hedrick and others, *The small fruits of New York*, 1925; Mrs. H. Resvoll Holmsen, *Exploration du nord-ouest du Spitsberg entreprise . . . par la mission Isachsen: observations botaniques*, 1913; C. Hummel, *Report on the forests of British Honduras*, 1925 (from the Conservator of Forests, British Honduras); *Illustrations of Japanese fungi*, tt. 17-20, with text and index, [1925?] (from the Forest Experiment Station, Meguro, Tokyo); W. L. Jepson, *Flora of California*, pts. 6 and 7, 1922; R. Kanehira, *Anatomical characters and identification of the important woods of the Japanese Empire*; A. W. Knapp, *Cocoa and chocolate: their history*, etc., 1920, and 5 pamphlets; V. L. Komarov, *Introduction à l'étude de la flore de l'Iakoutie*; C. E. Lane-Poole, *The forest resources of the territories of Papua and New Guinea*, and *Report on the forests of Norfolk Island* (from the Government of the Commonwealth of Australia, Home and Territories Department); J. I. Liro, *Tärkeimmät tuhosienet* [Parasitic fungi], 1917 (from Dr. E. J. Butler), and *Die Ustilagineen Finnlands*, I, 1924 (from Mr. A. D. Cotton); D. T. MacDougal, *The hydrostatic system of trees* (from the Carnegie Institution of Washington); J. H. Maiden, *Critical revision of the genus Eucalyptus*, pts. 65 and 66, 1925–26 (from Director, Botanic Gardens, Sydney); Alice Martineau, *The herbaceous garden*, 1923; K. Miyabe, *Festschrift*, 1911 (from Prof. K. Miyabe); K. Miyabe and Y. Kudo, *Icones of the essential forest trees of Hokkaido*, fasc. 11–14, 1925-26 (from the Government of Hokkaido, Japan); S. Murbeck, *Contributions à la connaissance de la flore du Maroc*, I–II, 1922–23, and *Monographie der Gattung Celsia*, 1925; F. Niedenzu, *Arbeiten aus dem botanischen Institut der staatl. Akademie in Braunsberg*, VIII (containing papers on *Malpighiaceae*); *North American Flora*, vol. 7, pt. 11 (from Dr. N. L. Britton); W. Nylander and A. Hue, *Addenda nova ad lichenographiam europaeam*, 1886–88 (from Miss

E. M. Wakefield); C. W. Peck, *Australian legends*, 1925 (from Dr. F. A. Rodway); C. C. Robertson, *The trees of extra-tropical Australia . . . from the point of view of their cultivation in South Africa* (from the Forest Department, Pretoria); R. A. Rye, *The libraries of London*, ed. 2, 1910; C. Skottsberg, *Juan Fernandez and Hawaii: a phytogeographical discussion*, 1925; H. H. Smith, *Ethnobotany of the Menomini Indians*, 1923, etc. (from Mr. T. A. Sprague); *Statistical atlas of the Bombay Presidency*, ed. 3, 1925 (from the Director of Agriculture, Bombay Presidency); F. Stephani, *Species Hepaticarum*, vol. vi, pp. 177–765, 1921–25 (from Prof. R. Chodat); A. G. Tansley and T. F. Chipp, *Aims and methods in the study of vegetation* (from the British Empire Vegetation Committee); N. I. Vavilov, *Studies in the origin of cultivated plants*; P. Vuillemin, *Les anomalies végétales: leur cause biologique*; W. Webb, *Garden first in land development*, ed. 2, 1920 (from Mr. J. H. Holland); F. A. F. C. Went, *Untersuchungen über Podostemaceen*, II–III, 1912 and 1926; O. F. Wuyts, *Le Dahlia: son histoire, sa culture*, etc. When the year of publication is not given it is 1926.

Periodical and serial publications received during the year include the following, which have been presented by their editors, or by the societies or institutions issuing them, unless otherwise stated:—*Acta Horti Botanici Universitatis Latviensis*, no. 2; *Acta Horti Gothoburgensis*, ii; *Acta Instituti et Horti Botanici Tartuensis*, vol. i, fasc. 1; *Annals of the Bolus Herbarium*, vol. iv, pt. 2; Bernice P. Bishop Museum, Honolulu, *Bulletins* 19, 25, 28, and *Special Publication* 10; Boyce Thompson Institute for Plant Research, Yonkers, New York, *Contributions*, vol. i, nos. 1–3, and *Professional Papers*, nos. 1–2; British Association for the Advancement of Science, *Report*, 1925 (from Miss E. M. Wakefield); *Bulletin du Jardin Botanique de Kieff*, nos. 2–3; *Bulletin of the Rubber Growers' Association*, vol. viii; Canada, National Research Council, *Reports*, nos. 17–18; Cheshunt, Experimental and Research Station, Turner's Hill, *Reports* 5–11; *Contributions du Laboratoire de Botanique de l'Université de Montreal*, nos. 4–5; East Malling Research Station, *Annual Report*, 1924; *Empire Cotton Growing Review*, vol. iii; Indian Tea Association, *Quarterly Journal*, 1925, pt. 4, 1926, pts. 1–3; *Folia Cryptogamica*, Szeged, Hungary, vol. i, no. 3; *Journal of the Arnold Arboretum*, vol. vii, nos. 1–3; *Journal of the Federated Malay States Museums*, vol. xiii, pts. 1–3; *Journal of the Gold Coast Agricultural and Commercial Society*, vol. iv, no. 3, vol. v, no. 1; *Journal and Proceedings of the Royal Society of New South Wales*, vol. lix; Liverpool University, *Publications of the Hartley Botanical Laboratories*, nos. 1–2; Lyon, Société Linneenne, *Annales*, 1925, and *Bulletin*, 1926 (from Dr. A. W. Hill); Marlborough College Natural History Society, *Report*, 1925; *Mémoires publiés par la Société Portugaise des Sciences Naturelles*, sér. zool., no. 2, sér. biol., no. 4; *Nederlandsch Kruidkundig Archief*, 1925; Nigeria, Geological Survey, *Bulletins* nos. 8–9 (from the Crown Agents for the Colonies); *Orchid Review*, vol. xxxiv; *Oxford Forestry*

Memoirs, nos. 4–6; *Proceedings of the Imperial Academy of Japan*, vol. ii, nos. 1–8; *Proceedings of the Pan-Pacific Science Congress, Australia*, 1923, 2 vols. (from the Council for Scientific and Industrial Research, Melbourne); *Recueil des Travaux Botaniques Néerlandais*, vol. xxii, livr. 1–4, vol. xxiii, livr. 1–2; *Rhododendron Society Notes*, vol. i–ii; Rothamsted Experimental Station Library, *Catalogue of the printed books on agriculture published between* 1471 *and* 1840, *with notes on the authors*; Royal Agricultural Society of England, *Agricultural research in* 1925; Royal Horticultural Society, *Journal*, vol. li, pt. 2, and *List of awards to decorative plants, fruits and vegetables*, 1911–14; *Sarawak Museum Journal*, vol. iii, pts. 1–2; Tohoku Imperial University, Sendai, Japan, *Science Reports*, ser. 2, vol. vii, no. 4, vol. ix, no. 1, vol. x, no. 2; ser. 4, vol. i, nos. 3–4; *Transactions and Proceedings of the New Zealand Institute*, vol. lvi; *Transactions of the Royal Society of South Africa*, vol. xiii, pts. 2–4, vol. xiv, pt. 1; *Travaux du Laboratoire de Matière Médicale de la Faculté de Pharmacie de Paris*, tome xvi (from Prof. E. Perrot); *Tropical Woods*, nos. 5–8 and contents and index to nos. 1–8; Watson Botanical Exchange Club, *Annual Report*, 1925–26 (from Mr. H. S. Thompson); *The Wellcome Bureau of Scientific Research and Museum of Medical Science*, 1926 (an illustrated account of the buildings and exhibits, with a list of scientific papers prepared in the Wellcome Physiological Research Laboratories); *Welsh Journal of Agriculture*, vol. ii (from Prof. R. G. Stapledon); Yale University School of Forestry, *Bulletins*, nos. 15–18.

Numerous papers, usually reprints from journals or other publications, forming additions to the large collection of tracts in the library, have been received from their authors or in a few cases from other sources. The principal contributors of these have been:—Mr. W. R. G. Atkins, Prof. E. B. Babcock, Botanical Department of Purdue University, Botanical Department of the University of Melbourne, Prof. V. F. Brotherus, Dr. P. Bugnon, Miss A. Camus, Mr. H. Chermezon, Major T. F. Chipp, Dr. H. A. Gleason, Dr. A. W. Hill, Prof. C. C. Hosseus, Prof. E. C. Jeffrey, John Innes Horticultural Institution, Dr. J. M. Macfarlane, Mr. F. Pellegrin, Mr. T. Petch, Polish Society of Naturalists, Mr. Paul Popenoe, Dr. A. B. Rendle, Prof. A. K. Schindler, Prof. Hans Schinz, Mr. T. A. Sprague, Mr. I. Thériot, Prof. J. C. Th. Uphof, Dr. Th. Valeton, Mr. C. T. White, and Prof. R. H. Yapp.

Societies, academies, and other institutions, from which publications have been received, and which have not already been mentioned, include the following:—Royal Swedish Academy of Sciences, Stockholm; Royal University, Upsala; Danish Botanical Society; Botanical Garden, Copenhagen; Botanical Garden, Utrecht; Botanical Garden, Leningrad; Muséum National d'Histoire Naturelle, Paris; Botanical Museum, University of Zurich; Institute of Botany, University of Geneva; Botanical Society of Geneva; Faculty of Science, Masaryk University, Brno; Agricultural Research Institute, Pusa; Indian Tea Association, Calcutta; Department of Agriculture, Peradeniya; Bureaux of

Science, Agriculture and Forestry, Philippine Islands; Departments of Agriculture of Queensland, New South Wales, and Victoria; Ministry of Agriculture, Egypt; Union of South Africa Department of Agriculture; Botanical Survey of South Africa; United States Department of Agriculture; Smithsonian Institution, Washington; Gray Herbarium of Harvard University; Brooklyn Botanical Garden; Cornell University Agricultural Experiment Station; Missouri Botanical Garden; Field Museum, Chicago; California Academy of Sciences; University of California; and Direccion de Estudios Biologicos, Mexico.

The copy of Candolle's *Plantarum succulentarum historia*, which has been presented by the Bentham Trustees, is a fine example of the large paper issue, in a remarkably clean condition and uncut. It is believed that it contains all the plates and text published; thus, apparently, it is one of the very few copies of which this could be said. The work was issued on small as well as on large paper, and copies of both sizes are known to vary considerably in the number of plates and in the amount of text they contain. As it has been stated that no text to certain plates was ever published it is thought to be desirable to give some particulars of the copy recently acquired, from which it will be seen that the text, which is so often deficient in copies of the work, and has accordingly been regarded as non-existent, was actually issued.

The imprint on the title-page of each of the two volumes is the same and reads: "A Paris chez Garnery, Libraire. MDCCCXXXVII." There is a second title-page in vol. i the imprint of which has "Chez A. J. Dugour et Durand, Libraires," and the year "An VII." The same preface is used for both volumes, but at the foot of that in vol. ii occur the words "Paris, 15 Ventôse An VIII" [= March 5, 1800]. There are 187 plates, all of them accompanied by descriptive text. The arrangement of text and plates in this copy is alphabetical, but there are a few exceptions; thus, the two species of *Mesembryanthemum* issued in the final part (livraison 31) are placed at the end of the other species of the genus, and not in alphabetical order. At the end of the second volume is a "Table des espèces contenues dans les *trente* prèmieres livraisons de l'Histoire des plantes grasses." We know that 31 livraisons were issued. The plates, all with text, contained in the 31st livraison are: t. 172, *Stapelia grandiflora*; t. 173, *Talinum patens*; t. 174, *Kalanchoe crenata*; t. 175, *Reaumuria vermiculata*; t. 176, *Mesembryanthemum lacerum*; and t. 177, *M. crassifolium*. All these are included in the copy now at Kew.

The work terminated, it would appear, with the plate and text of *Mesembryanthemum crassifolium* (t. 177). That there should be 187 plates in a complete copy is explained by there being two or more plates of certain species for which the same number is employed. Thus, there are four plates illustrating varieties of *Cactus Opuntia* the text of which is numbered 138 and 138*.

The cause of the incompleteness of so many copies of this work

is no doubt due to an interruption in its publication, which occurred after the issue of livraison 28, and this can be traced to a dispute between A. P. de Candolle and the publisher of it, Garnery. Candolle had made some arrangement with Garnery for the publication by him of a work on parasitic fungi by R. A. Hedwig. Notwithstanding this arrangement Garnery, as stated by Candolle (*Memoires*, p. 143) "s'en dégoûta au bout de quelque temps. Ne voulant pas paraître négligent aux yeux d'Hedwig, j'engageai Garnery à lui écrire pour lui expliquer ses motifs. Il le promit et ne le fit pas. Je me fâchai et lui déclarai que je ne lui donnerais plus de texte des *Plantes grasses* jusqu'à ce qu'il eût écrit: il se piqua, et quoiqu'il eût alors huit à dix livraisons gravées il ne voulut pas écrire; je tins bon, et cet incident a déterminé la cessation de la publication des *Plantes grasses*. Dès lors Garnery fit banqueroute. Je n'entendis plus parler de lui jusqu'en 1829, qu'il vint me proposer de reprendre l'entreprise. J'avais alors d'autres idées; je cédai l'affaire à Guillemin, brave jeune homme dont je parlerai dans la suite, mais l'ouvrage ne fut pas repris."

As already shown the work was resumed and text to livraisons 29 to 31 was eventually published, that to 29 and 30 in 1832 (see Lasègue in *Ann. Sci. Nat.* 2e sér., xvii, p. 295). Lasègue does not mention the text of livraison 31. It was very probably published also in 1832. The text of 3 of the plates in these livraisons was written by Candolle and that of the other 15 by Guillemin.

For many years there has been at Kew a copy of the small paper issue. This contains 192 plates, being all those in the large paper issue and 5 additional ones, which are placed at the end of the work and are apparently proofs of plates that were never published. These 5 plates are: *Stapelia punctata, Sesuvium revolutum, Agave vivipara, Mesembryanthemum apetalum* (a tracing of a drawing which is the same as that on t. 88 and there intended for *M. nodiflorum*), and *Crassula scabra brevifolia*. In this copy there is no text after that to plate 159.

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